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I-MOVE-COVID-19 Network

Multidisciplinary European network for research, prevention and control of the COVID-19 pandemic

COVID-19 European Hospital Surveillance: Fifth Bulletin

SEPTEMBER 2021

I-MOVE-COVID-19 Network

WP3 coordinated by Public Health Scotland

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Abbreviations

AL	Albania
BE	Belgium
COVID-19	Coronavirus disease 2019
EEA	European Economic Area
ECDC	European Centre for Disease Prevention and Control
EMCO	Extracorporeal membrane oxygenation
EN	England
ES	Spain **(**regions of Granada and Aragon)
EU	European Union
FR-V	France ViVI
FR-R	France I-REIVAC
GP	General practitioner
HCW	Healthcare worker
HDU	High dependency unit
ICD	International Classification of Diseases
ICU	Intensive care unit
ILI	Influenza-like illness
I-MOVE	Influenza – Monitoring Vaccine Effectiveness in Europe
LT	Lithuania
NA	Navarra region, Spain
PT	Portugal
RO	Romania
RT- PCR	Real-Time Polymerase Chain Reaction
SARI	Severe Acute Respiratory Infection
SARS-CoV-2	Severe Acute Respiratory Syndrome – Coronavirus 2
SC	Scotland
WP-3	Work Package 3

Summary

This fifth surveillance report summarises information from the Influenza – Monitoring Vaccine Effectiveness in Europe - Coronavirus Disease 2019 (I-MOVE-COVID-19) hospital surveillance network. The I-MOVE-COVID-19 hospital surveillance aims to reinforce and complement the COVID-19 epidemiological data in the EU/EEA, Albania and the UK that are compiled and reported by the European Centre for Disease Prevention and Control (ECDC).

There are 11 participating hospital sites in the nine European countries that are part of the I-MOVE-COVID-19 network contributing data to the surveillance. Hospitalised patients with confirmed, probable or suspected SARS-CoV-2 virus infection are included as COVID-19 cases. Data are collected following a generic protocol. Differences between countries occur in the range and completeness of data collected, as a result of the variances between health care systems, hospital admission policy, or data collection methods.

A total of 98,818 COVID-19 cases were reported to the surveillance system between 01 February 2020 and 30 June 2021; 95,622 (97%) laboratory confirmed, 289 (<1%) probable and 2,907 (3%) suspected. The case definitions are outlined in Appendix 1.3. Of these, 58,345 (59%) were reported from England and 25,306 (26%) from Scotland, as these sites both submit national data.

This bulletin presents the results since the start of the data collection (01 February 2020 – 30 June 2021), with additional analysis focusing on the 2,435 hospitalised cases between 01 April 2021 and 30 June 2021. As per previous bulletins, sentinel hospitals in England and hospitals in Scotland were randomly sampled, to ensure that these countries are not over-represented in the dataset and that analysis is not skewed towards any particular site.

- Of the total 2,435 hospitalised cases recorded from 01 April to 30 June 2021, 1,361 (56%) patients were male and 1,071 (44%) were female (three records missing/unknown).
- The median age between 01 April and 30 June 2021 was 57 years, range 0–101 years (n=2,434; age was missing for one record) and decreased considerably from previous quarters.
- Patients with two or more underlying chronic conditions were more likely to be admitted to an intensive care unit/ high dependency unit (ICU/HDU), and were more likely to die compared with patients with one or no conditions (p <0.001).
- The most commonly reported underlying chronic conditions were hypertension (N=413; 36%), obesity (n= 435; 36%) and diabetes (n=253; 19%).
- Ninety-four percent (210/223) of cases with respiratory information available presented with respiratory symptoms (at or pre-admission). Febrile illness was also very common (119/148; 80%); while over two-thirds presented with neurological symptoms (126/181; 70%) and almost half experienced gastrointestinal symptoms (88/138; 64%).

- Of the cases with symptom information available for fever and cough, 71% (108/147) presented with fever symptoms and 68% (167/237) with a cough.

- The median length of hospital stay was 8 days. Two hundred and eighty-one (16%) COVID-19 cases required an ICU/HDU admission and 135 (8%) were reported to have died in hospital.

- Overall trends in outcomes among patients in participating hospitals from the start of the pandemic in February 2020 to the end of June 2021 show:
    - a reduction in the median length of stay in hospital from 11 to 8 days
    - a decline in the number of ICU/HDU admissions from 20% to 16%
    - a decrease in the number of deaths from 23% to 8%.

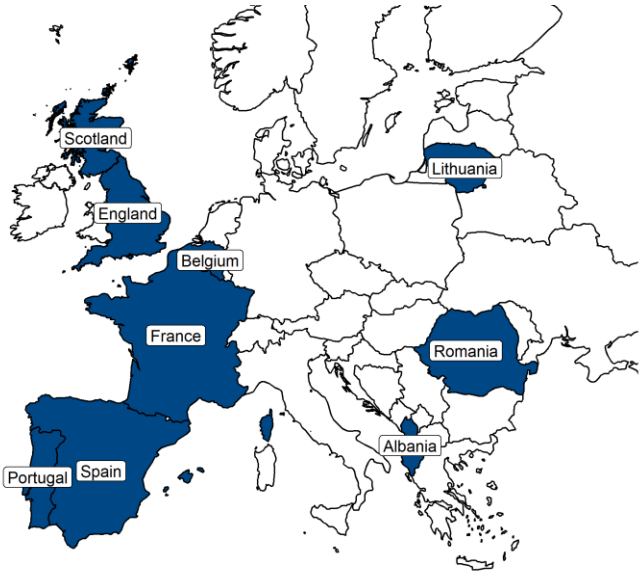
- Analysis over time shows a statistically significant decrease in number of ICU/HDU admissions in males and females between the second and third wave (between summer 2020 and winter 2021) ($p<0.01$). The number of deaths also show a statistically significant decrease in both male and female and in all age groups ($p<0.01$) except in those aged under 14 years ($p=0.63$). The start and end dates of the waves for each site are described in Appendix 1.5.

Background

Participating sites

The I-MOVE-COVID-19 Work Package 3 (WP3) hospital surveillance is coordinated by Public Health Scotland (PHS), in collaboration with Epiconcept. The network comprises 11 surveillance sites in nine European countries: Albania, England, Scotland, and six EU Member States (Belgium, France, Lithuania, Portugal, Romania, and Spain) (Figure 1). Spain and France have two participating sites in different regions.

Figure 1: Map of countries participating in I-MOVE-COVID-19 WP3 hospital surveillance



Data submission and selection

Sites submit surveillance data securely to Epiconcept every quarter for cleaning and pooling; the anonymised, pooled dataset is then analysed by PHS. Table 1 describes the participating sites and the data they have contributed to the surveillance to date[1]. Most sites generate their data using surveillance forms implemented at a small number of designated hospitals; however, surveillance data for both England and Scotland is generated through the linkage of routinely collected national datasets. As a result, the data contributed by these countries dominates the pooled dataset. COVID-19 reporting is also mandatory for patients admitted to ICU in England, while reporting is not mandatory for all hospitalised cases. For this reason, data from England tends to be skewed towards more severe outcomes (i.e. a higher percentage of ICU patients).

As in the previous bulletin, to prevent any site being over-represented in the dataset, random samples of the English and Scottish data were selected for analysis. These samples may differ in each section of the report according to the surveillance theme being addressed; this is specified in each section.

[1]The period for which data were submitted do not necessarily reflect the total duration of the epidemic in that country.

Table 1 Countries participating in I-MOVE-COVID-19 (WP3) European hospital surveillance and their respective contribution to this report between 01 Feb 2020 and 30 June 2021

Country	Region	Participating hospitals	Number of cases (%)	Admission of first reported case		Admission of last reported case	
				Date	Week	Date	Week
Albania (AL)	-	Two hospitals	1,308 (1.3)	20 Feb 2020	08	28 Feb 2021	08
Belgium (BE)	-	One hospital	1,348 (1.4)	21 Feb 2020	08	25 Jun 2021	25
England (EN)	Nationwide	All hospitals, including mandatory reporting from ICUs/HDUs	58,345 (59.0)	15 Mar 2020	11	30 Jun 2021	26
France (FR)	Two sites:						
	FR-R (REIVAC)	Five hospitals	1,527 (1.5)	01 Feb 2020	05	27 Jun 2021	25
	FR-V (ViVI)	Two hospitals,	20 (<0.5)	07 May 2020	19	22 Oct 2020	43
Lithuania (LT)	-	Two hospitals	687 (0.7)	07 Mar 2020	10	25 May 2021	21
Portugal (PT)	-	Three hospitals	779 (0.8)	13 Feb 2020	07	30 Jun 2021	26
Romania (RO)	-	Two hospitals,	505 (0.5)	10 Mar 2020	11	25 Jun 2021	25
Scotland (SC)	Nationwide	All hospitals	25,301 (25.6)	03 Mar 2020	10	30 June 2021	26
Spain (ES)	Two sites:						
	ES	Two hospitals	3,529 (3.6)	20 Feb 2020	08	30 Jun 2021	26
	NA	Navarra region: six hospitals	5,464 (5.5)	06 Feb 2020	06	19 Jun 2021	26
Total			**98,813**	**01 Feb 2020**	**05**	**30 Jun 2021**	**26**

Section One – Demographic characteristics

Methodology

- Selection of EN cases[2]

The English dataset is generated from national registers and comprises 59% of all records within the pooled dataset. In addition to this, mandatory reporting is only necessary from ICU/HDUs within English hospitals, which skews the data towards more severe outcomes. Both of these factors would significantly affect the representativeness of the European pooled dataset if the entire dataset from England were included.

To counteract the over-representation of more severe outcomes, a "sentinel" variable was added to the dataset which defines the 53 hospitals which report from all wards and therefore include patients experiencing all levels of care. The number of cases selected from the English dataset was reduced, to be in line with the numbers recorded by Navarra, as they have submitted the third largest number of records (Table 1) and the highest number of cases through a sentinel surveillance system. Therefore, a random selection of 6,000 cases from those with the "sentinel" variable from England were included in this dataset.

- Selection of SC cases

The Scottish dataset is collected from national registers and comprises 26% of the overall European pooled dataset, with the next largest site (Navarra) comprising 6%. As for England, only a select number of the records can be used for analysis, and again 6,000 cases were randomly selected for inclusion.

- Final selection included for analysis

The final selection comprised 27,167 cases, of which 24,455 (90%) were laboratory confirmed, 288 (1%) were probable and 2,404 (9 %) suspected. Table 2 describes the details of the contributions of data by site since the start of the pandemic. In this bulletin, the analysis focuses on the latest data from the 01 April 2021–to 30 June 2021. Table 3 describes the contribution of the data by site for this quarter (01 April to 30 June 2021) only. Results from FR-V are not included in the analysis presented in this section due to the small number of reported cases (see Table 1).

[2]For this section of the analysis, confirmed, probable and suspected cases were included, and records missing key variables like age, sex, or dates of onset/discharge were not dropped

Table 2 Countries participating in I-MOVE-COVID-19 (WP3) European hospital surveillance and their respective contribution after selection of 6,000 cases each from England and Scotland, 01 February 2020 to 30 June 2021.

Country	Region	Participating hospitals	Number of cases (%)	Admission of first reported case		Admission of last reported case	
				Date	Week	Date	Week
Albania (AL)	-	Two hospitals	1,308 (4.8)	20 Feb 2020	08	28 Feb 2021	8
Belgium (BE)	-	One hospital	1,348 (5.0)	21 Feb 2020	08	25 Jun 2021	25
England (EN)	Nationwide[3]	Randomly selected from 53 sentinel hospitals	6,000 (22.1)	15 Mar 2020	11	30 Jun 2021	26
France (FR)	Two sites:						
	FR-R (REIVAC)	Five hospitals	1,527 (5.6)	01 Feb 2020	05	27 Jun 2021	25
	FR-V (ViVI)	Two hospitals	20 (0)	07 May 2020	19	22 Oct 2020	43
Lithuania (LT)	-	Two hospitals	687 (2.5)	07 Mar 2020	10	25 May 2021	21
Portugal (PT)	-	Three hospitals	779 (2.9)	13 Feb 2020	07	30 Jun 2021	26
Romania (RO)	-	Two hospitals	505 (1.9)	10 Mar 2020	11	25 Jun 2021	25
Scotland (SC)	Nationwide[4]	All hospitals	6,000 (22.1)	03 Mar 2020	10	30 Jun 2021	26
Spain	Two sites:						
	ES	Two hospital	3,529 (13.0)	20 Feb 2020	08	30 Jun 2021	26
	NA	Navarra region: six hospitals	5,464 (20.1)	06 Feb 2020	06	19 Jun 2021	24
Total			**27,167**	**01 Feb 2020**	**05**	**30 Jun 2021**	**26**

[3] Randomly selected 6,000 cases from sentinel hospitals in England.

[4] Randomly selected 6,000 cases from Scotland's sample.

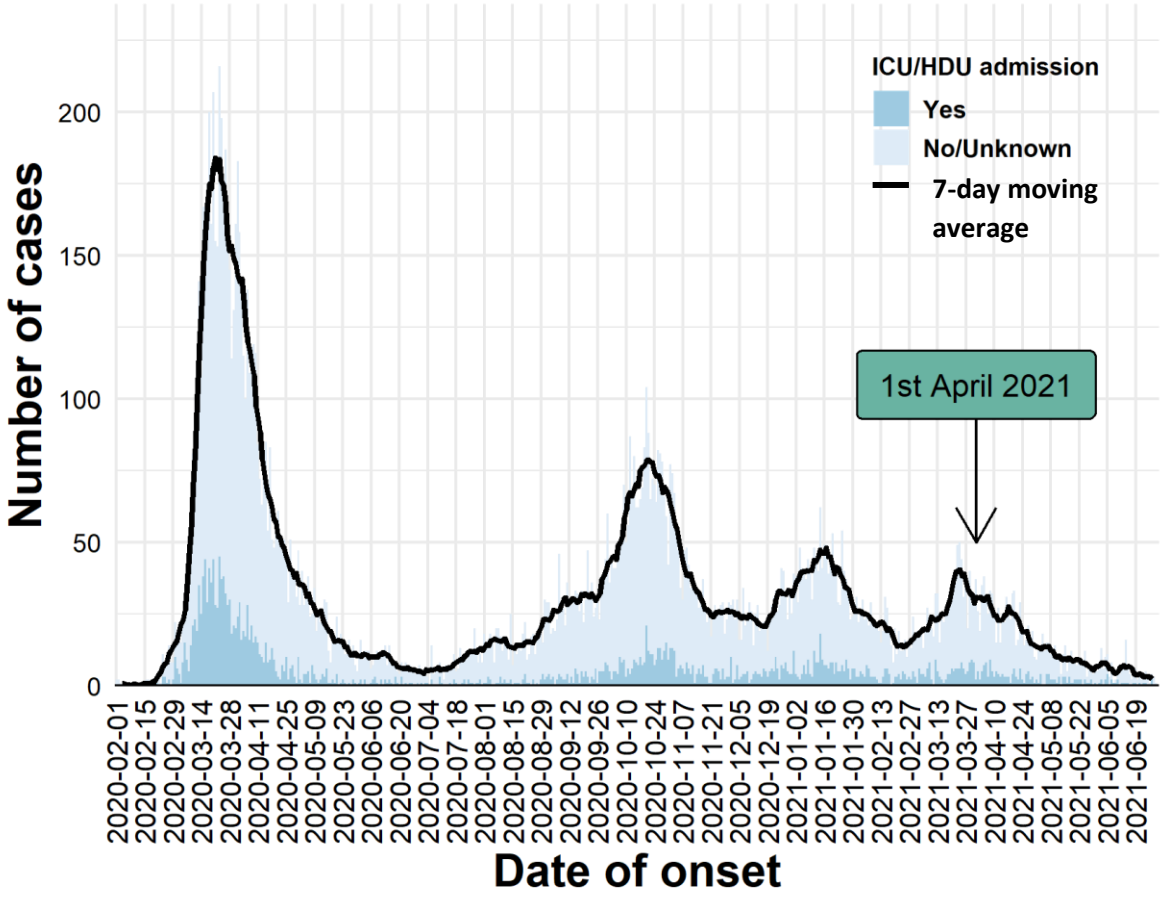
Table 3 Countries participating in I-MOVE-COVID-19 (WP3) European hospital surveillance and their respective contribution of quarterly data, 01 April to 30 June 2021.

Country	Region	Participating hospitals	Number of cases (%)	Admission of first reported case		Admission of last reported case	
				Date	Week	Date	Week
Albania (AL)	-	Two hospitals	- (-)	-	-	-	-
Belgium (BE)	-	One hospital	199 (8)	01 Apr 2021	13	25 Jun 2021	25
England (EN)	Nationwide	Randomly selected from 53 sentinel hospitals	145 (6)	01 Apr 2021	13	30 Jun 2021	26
France (FR)	Two site:						
	FR-R (REIVAC)	Five hospitals	191 (8)	01 Apr 2021	13	27 Jun 2021	25
	FR-V (ViVI)	Two hospitals	- (-)	-	-	-	-
Lithuania (LT)	-	Two hospitals	31 (1)	06 Apr 2021	14	25 May 2021	21
Portugal (PT)	-	Three hospitals	63 (3)	03 Apr 2021	13	30 Jun 2021	26
Romania (RO)	-	Two hospitals	40 (2)	01 Apr 2021	13	25 Jun 2021	25
Scotland (SC)	Nationwide	All hospitals	476 (20)	01 Apr 2021	13	30 Jun 2021	26
Spain	Two sites:						
	ES	Two hospital	684 (28)	01 Apr 2021	13	30 Jun 2021	26
	NA	Navarra region: six hospitals	606 (25)	01 Apr 2021	13	19 Jun 2021	24
Total			**2,435**	**01 Apr 2021**	**13**	**30 Jun 2021**	**26**

Cases over time (01 February 2020 to 30 June 2021)

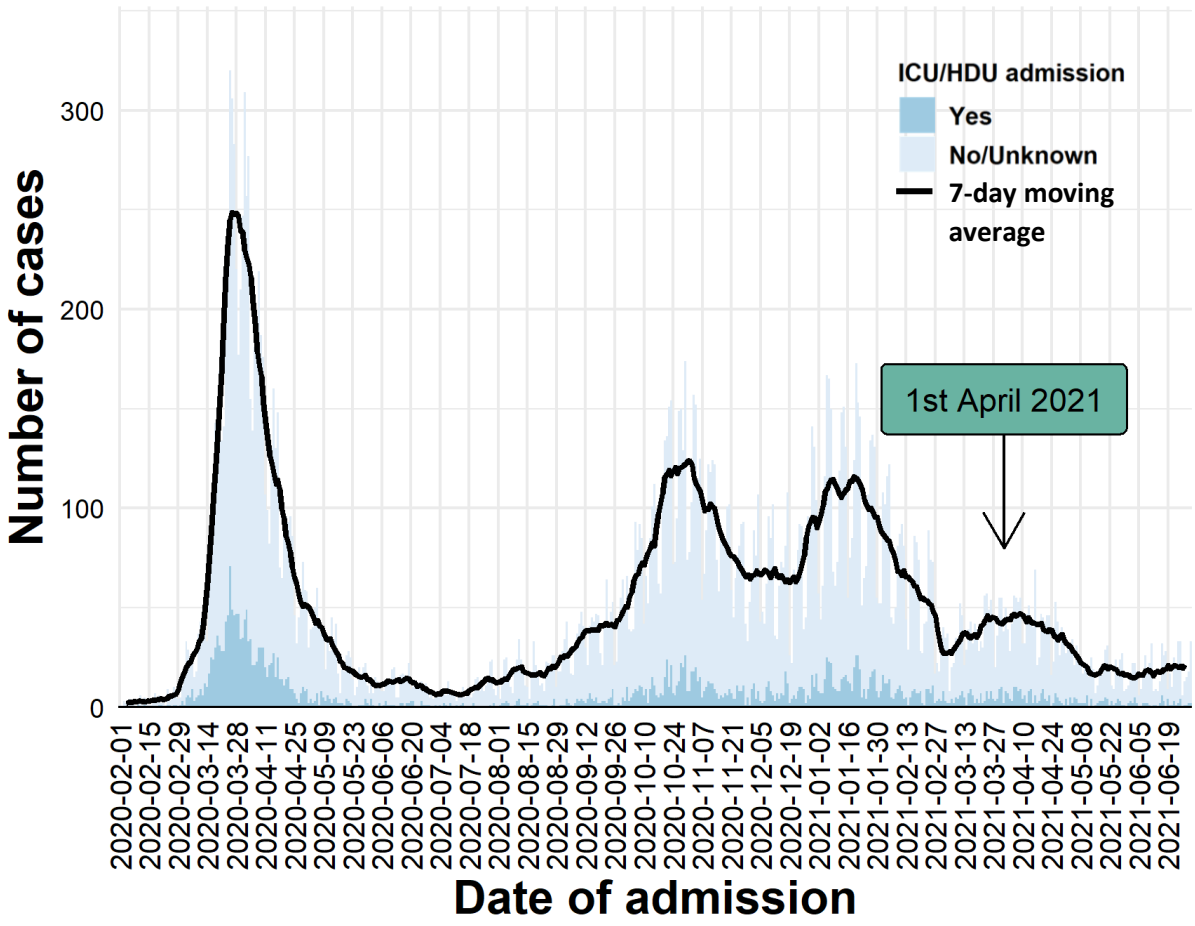
The number of confirmed, probable and suspected cases reported overall by date of onset of symptoms and date of hospital admission are presented in Figures 2 and 3, respectively, categorised by ICU/HDU admission[5]. The graphs of number of cases over time for each country are presented in Appendix 1.4.

Figure 2 Number of confirmed, probable and suspected cases reported overall by week of symptom onset, 01 February 2020 to 30 June 2021



[5] Graphs for each sites are presented in Appendix 1.4

Figure 3 Number of confirmed, probable and suspected cases reported overall by week of hospital admission, 01 February 2020 to 30 June 2021.



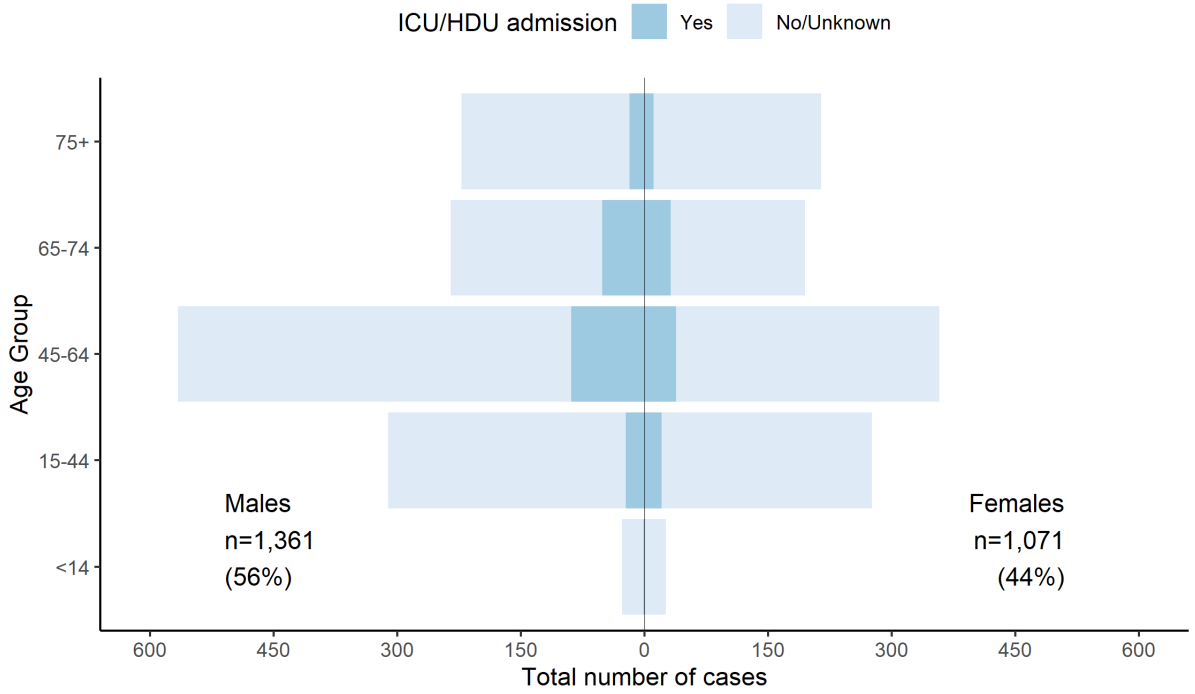
Trends in demographics, 01 April to 30 June 2021

The demographic characteristics of the patients in the surveillance dataset from 01 April to 30 June 2021 indicate:

- 56% of cases were **male** (1,361/2,432; 3 records missing/unknown).
- The median **age** of cases was 57 years, range 0–101 years (n=2,434; 1 record missing age).
- 6% of cases had **supported living arrangements**[6] prior to admission (65/1,182; 1,253 records missing/unknown).

Figure 4 shows the sex and age distribution of confirmed, probable and suspected cases overall, categorised by ICU and HDU admissions. The majority of hospitalised cases from April to June 2021 are aged 45–64 years and overall there are more men (n=1,356, 56%) than women (n=1,057, 44%). There is a similar pattern for ICU/HDU admissions, with overall more men (n=183, 64%) than women (n=101, 36%) and the majority of those in ICU/HDU are also aged 45–64 years. There are also more men and women in the age-group 15–54 years than there are in either of the older adult age groups (65–74 or 75+ years).

Figure 4: **Age and sex distribution of confirmed, probable and suspected COVID-19 cases by ICU/HDU admission, 01 April to 30 June 2021**



The age and sex distribution of confirmed, probable and suspected COVID-19 cases by hospital and ICU/HDU admission can be found in Appendix 1.5[7]. Note that these are absolute numbers, that are not

[6] Prior to admission, patient was either living at home with home support/care, or was institutionalised

[7] Owing to the small number of cases, results are not presented for FR-V.

age-adjusted according to a country's population structure, and that not all sites receive paediatric patients or collect data on paediatric cases (<18 years of age).

Trends in demographics by quarter from 01 February 2020 to 30 June 2021

Table 4 shows the trends in demographics for all sites since the start of the pandemic. In each quarter since February 2020, a higher proportion of men were hospitalised. The median age in years of hospitalised patients has reduced over time from 69 years in February 2020, to 57 by the end of June 2021. Similarly, there has been a reduction in the number and proportion of hospitalised patients who were admitted from supported living arrangements (Figure 5). The percentage of patients who were reported to reside in a supported living arrangement reached a maximum of 24% between April and June 2020; this has since decreased to 6% in the period 01 April to 30 June 2021. This reduction may be explained by the impact of vaccinations and reducing number of cases after the first wave in those groups residing in supported living arrangements.

Table 4 Number of patients, male and female ratio and median age (in years) in ICU/HDU by age group, 01 January to March 2021 and 01 April to 30 June 2021

Period Begins	Period Ends	Number of Male Patients (%)	Number of Female Patients (%)	Male:Female ratio	Median Age (years)
01 Feb 2020	31 Mar 2020	2,099 (57)	1,584 (43)	1.3	69
01 Apr 2020	30 Jun 2020	2,673 (53)	2,371 (47)	1.1	72
01 Jun 2020	30 Sep 2020	1,036 (53)	919 (47)	1.1	64
01 Oct 2020	31 Dec 2020	4,248 (55)	3,476 (45)	1.2	69
01 Jan 2021	31 Mar 2021	3,336 (54)	2,842 (46)	1.2	66
01 Apr 2021	30 Jun 2021	1,361 (56)	1,070 (44)	1.3	57

The median length of stay in ICU/HDU is 8 days (Figure 7); this has remained the same in the latest quarter (01 April to 30 June 2021) as in the previous quarter, 01 January to 31 March 2021. The longest median stay was recorded for those aged 65–74 years, followed by those aged 75 years or over. It is expected that the number of ICU/HDU admissions and length of stay in ICU/HDU will decline following the implementation of the COVID-19 vaccine, particularly in the older age groups; however, most people may not have had both doses within this study period. The highest proportion of hospitalised patients who were admitted to ICU/HDU were consistently those aged 45–64 years, followed by those aged 65–74 (Figure 6).

Figure 5: **Percentage of hospitalised patients who reside in supported living arrangements, 01 February 2020 to 30 June 2021, by quarter.**

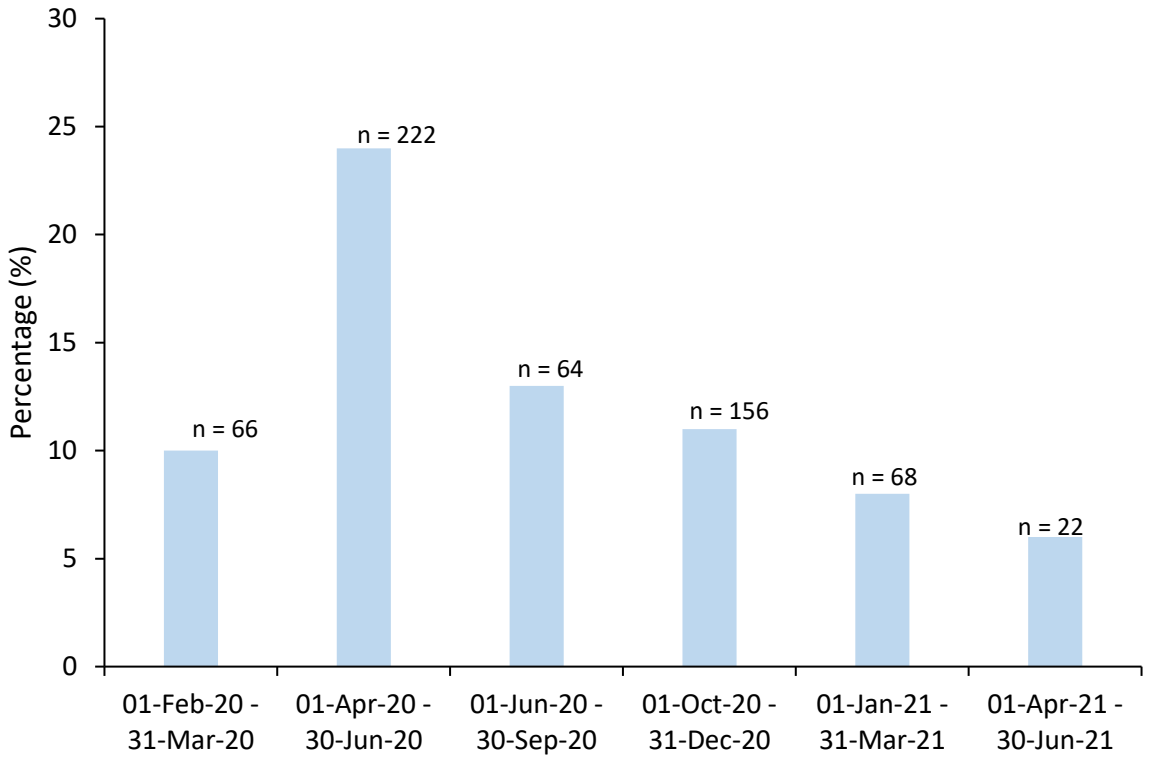


Figure 6: **Proportion of hospitalised patients admitted to ICU/HDU facilities, 01 February 2020 to 30 June 2021, by annual quarter and by age group.**

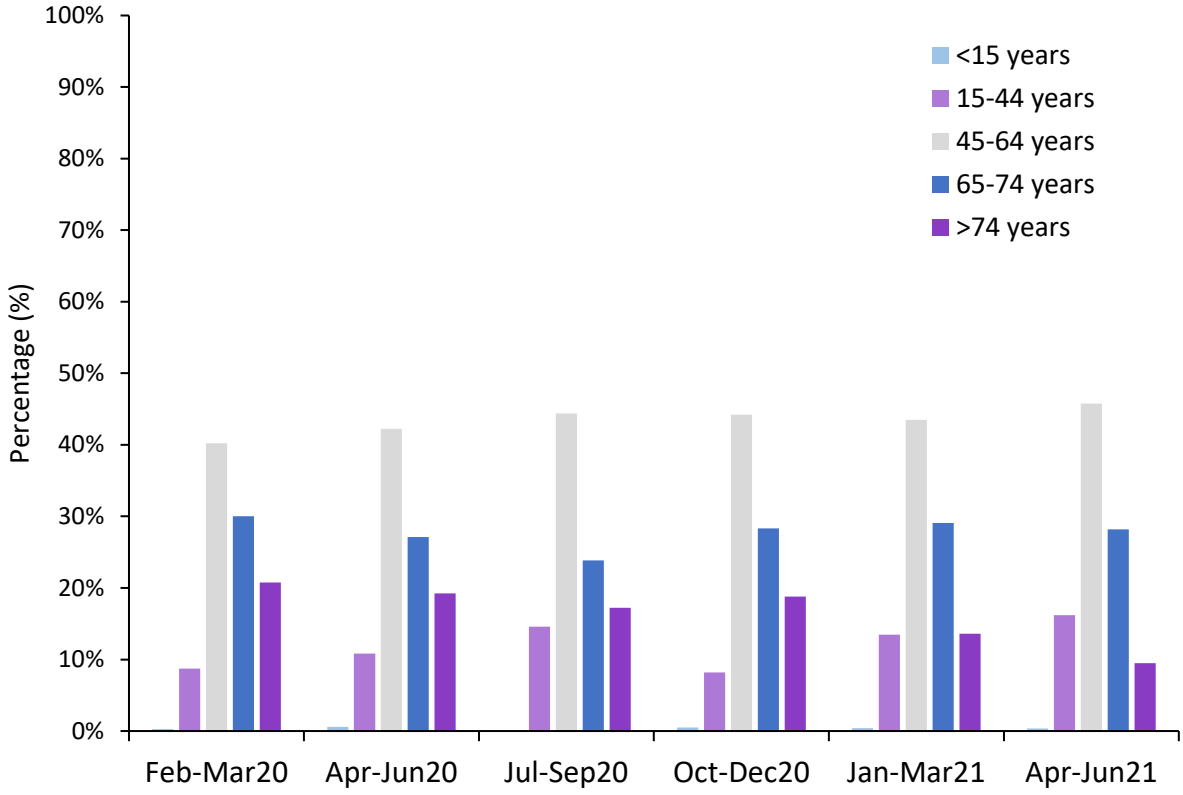
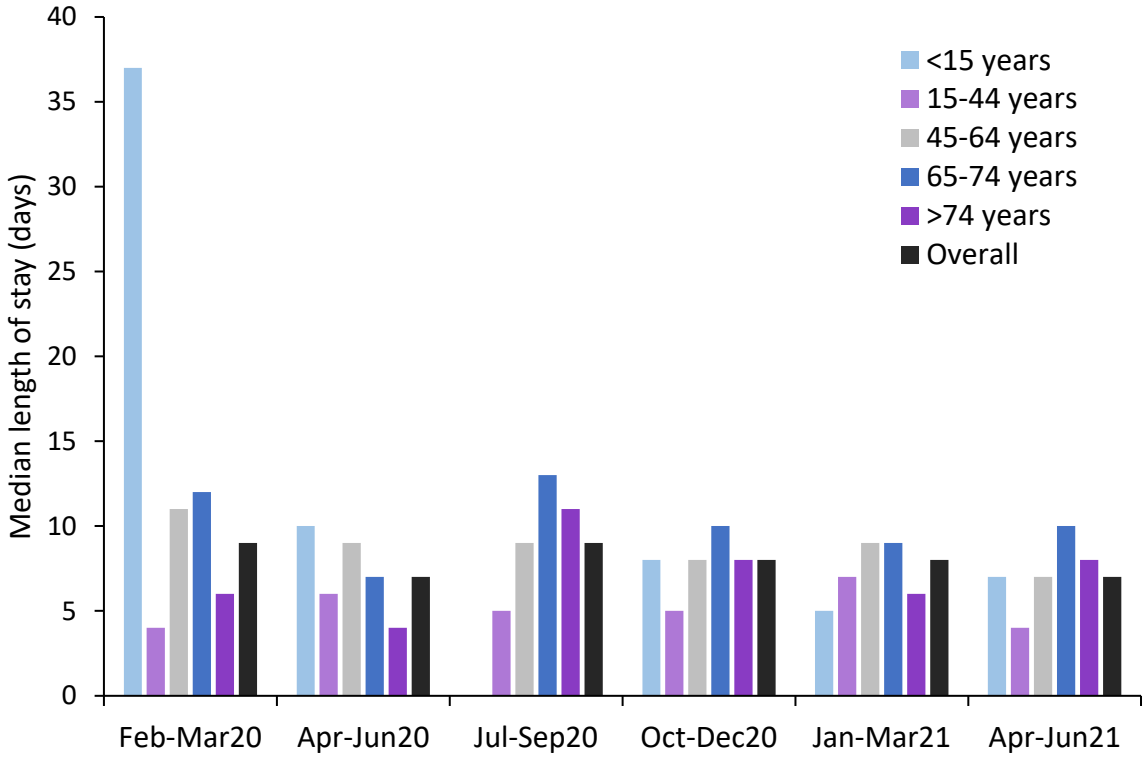


Figure 7: **The median length of stay (in days) in ICU/HDU facilities, 01 February 2020 to 30 June 2021, by annual quarters and by age group.**



Section Two – Clinical Characteristics

Methodology

- Cases included

For this part of the bulletin, the analysis is limited to confirmed cases where key variables (age, sex and date of admission) were not missing. Results from FR-V are not included in the analysis presented in this section due to the small number of reported cases. The final selection comprised 1,462 cases.

Table 5 describes the contribution of the data by site.

- Selection of EN cases

Cases were selected in the same way as outlined in Section One. England provide onset data, but no symptom data and are therefore not included in the symptom section below.

- Selection of SC cases

The Scottish dataset is created through linkage of national-level, complete data registries and appending an enhanced COVID-19 surveillance dataset for a smaller proportion of cases (n=5,694; 22% of the entire Scottish dataset). The enhanced surveillance dataset was created for research purposes and includes granular data on patient characteristics, symptoms and treatments. These variables are only available for cases in the enhanced surveillance dataset. As a result, for this section of the report, all cases between April and June 2021 were selected in this enhanced surveillance data. Utilising this selection methodology results in numerous cases which were included in Section One now being excluded and vice versa. In addition to this, the additional enhanced COVID-19 surveillance dataset is not representative of the entire nation of Scotland. Therefore, care should be taken when interpreting any of the data analysis.

Table 5 Confirmed hospitalised cases from European countries participating in I-MOVE-COVID-19 (WP3) European hospital surveillance, 01 April to 30 June 2021.

Country	Region	Participating hospitals	Number of cases (%)	Admission of first reported case		Admission of last reported case	
				Date	Week	Date	Week
Albania (AL)	-	Two hospitals	- (-)	-	-	-	-
Belgium (BE)	-	One hospital	192 (13.1)	01 Apr 2021	13	25 Jun 2021	25
England (EN)	Nationwide	Randomly selected from 53sentinel hospitals	143 (9.8)	01 Apr 2021	13	30 Jun 2021	26
France (FR)	Two sites:						
	FR-R (REIVAC)	Five hospitals	189 (12.9)	01 Apr 2021	13	21 Jun 2021	25
	FR-V (ViVI)	Two hospitals	- (-)	-	-	-	-
Lithuania (LT)	-	Two hospitals	31(2.1)	06 Apr 2021	14	25 May 2021	21
Portugal (PT)	-	Three hospitals, all wards	63 (4.3)	03 Apr 2021	13	30 Jun 2021	26
Romania (RO)	-	Two hospitals, all wards	<10 (0.6)	02 Apr 2021	13	03 May 2021	18
Scotland (SC)	Nationwide	All hospitals participating in enhanced surveillance (n=5,694)	101 (6.9)	01 Apr 2021	13 .	30 Jun 2021	26
Spain	Two sites:						
	ES	Two hospitals	128 (8.8)	06 Apr 2021	14	22 Jun 2021	25
	NA	Navarra region: six hospitals	606 (41.5)	01 Apr 2021	13	19 Jun 2021	24
Total			**1,462**	**01 Apr 2021**	**13**	**30 Jun 2021**	**26**

Chronic conditions

Table 6 shows the number of confirmed cases between April and June 2021, by underlying chronic condition. Sites collect information on chronic conditions with varying degrees of data completeness and this is reflected in the results. Information was most commonly available for heart and renal disease (1,346/1,462, 92%) and asplenia was least completed (423/1,462, 50%). The top five chronic conditions reported were hypertension (36%), obesity (36%), diabetes (19%), heart disease (16%) and lung disease (11%). This is similar to that reported between 01 January and 31 March 2021, as the top five chronic conditions remain the same; however, the proportion of COVID-19 patients reporting hypertension and heart disease have dropped from 42% between 01 January and 31 March 2021 to 36% and from 27% to 16% respectively. The proportions of COVID-19 patients with diabetes and lung disease have declined in this latest quarter compared to the previous one (January–March 2021), by 4 and 3 percentage points, respectively (Table 6). Conversely, over the same period, the proportion of obese patients increased from 29% to 36%.

Table 6 Number and proportion (%) confirmed COVID-19 patients with underlying chronic conditions, April to June 2021.

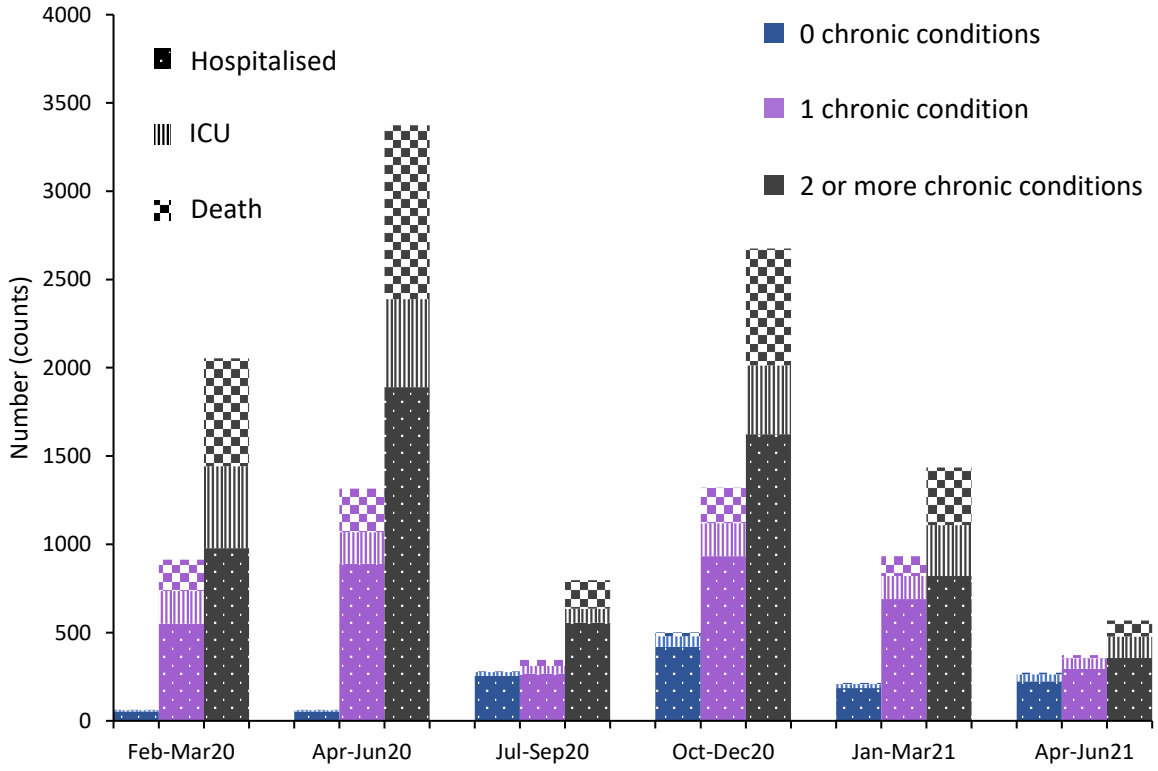
	Number (%) of cases with information available	Number (%) of cases with chronic condition
Hypertension	1,161 (79.4)	413 (35.6)
Obese	1,222 (83.6)	435 (35.6)
Diabetes	1,340 (91.7)	253 (18.9)
Heart disease	1,346 (92.1)	213 (15.8)
Lung disease	1,276 (87.3)	141 (11.1)
Cancer	1,262 (86.3)	135 (10.7)
Asthma	1,183 (80.9)	100 (8.5)
Renal disease	1,346 (92.1)	113 (8.4)
Rheumatic illness	1,263 (86.4)	66 (5.2)
Stroke	1,193 (81.6)	43 (3.6)
Liver disease	1,341 (91.7)	41 (3.1)
Anaemia	1,193 (81.6)	36 (3.0)
Neuromuscular disorder	1,003 (68.6)	28 (2.8)
Dementia	1,261 (86.3)	20 (1.6)
Immunodeficient/organ transplant	1,263 (86.4)	19 (1.5)
Asplenia	423 (28.9)	2 (0.5)
Tuberculosis	736 (50.3)	4 (0.5)

Figure 8 shows the number and proportion of confirmed cases who had no, one, and two or more chronic conditions by hospital admissions, ICU/HDU admissions and death.

The number of patients admitted to hospital without any chronic conditions was higher between 01 April and 30 June 2021 compared with both the previous quarter (01 January to 30 March 2021) and the same period last year (01 April to 30 June 2020), while the number of patients with one or more chronic conditions was considerably lower in the latest quarter.

Between 01 April and 30 June 2021, patients with two or more underlying chronic conditions were more likely to be admitted to hospital, to ICU/HDU and were more likely to die compared with those with no or one condition. These differences were all statistically significant ($p < 0.001$) (Figure 8).

Figure 8: **The number of patients who have been hospitalised, admitted to ICU/HDU and died, by number of chronic conditions, 01 February 2020 to 30 June 2021.**



Symptoms

Table 7 describes confirmed cases by their symptoms before or at presentation. All sites, except for England, routinely report information on symptoms and each symptom is recorded separately. Therefore, completeness levels vary by symptom, but is generally very low and care should be taken when interpreting this analysis.

Of the cases with symptom information available for fever and cough, 71% (108/147) presented with fever symptoms and 68% (167/237) with a cough.

Table 7 Clinical characteristics of patients hospitalised with confirmed COVID-19, 01 April to 30 June 2021.

	Total number (%) with information available	Number (%) of cases with symptom
Symptom groups[8]		
Respiratory	223 (15.3)	210 (94.2)
Febrile illness	148 (10.1)	119 (80.4)
Neurological	181 (12.4)	126 (69.6)
Gastrointestinal	138 (9.4)	88 (63.8)
Other	191 (13.1)	166 (86.9)
Symptoms		
Fever	147 (10.1)	108 (73.5)
Cough	237 (16.2)	167 (70.5)
General deterioration	145 (9.9)	102 (70.3)
Shortness of breath	240 (16.4)	161 (67.1)
Feverishness	146 (10.0)	89 (61.0)
Tachypnoea	145 (9.9)	73 (50.3)
Malaise	230 (15.7)	111 (48.3)
Myalgia	227 (15.5)	76 (33.5)
Dizziness	141 (9.6)	42 (29.8)
Headache	227 (15.5)	66 (29.1)
Chest pain	233 (15.9)	58 (24.9)
Nausea	78 (5.3)	19 (24.4)
Chills	141 (9.6)	29 (20.6)
Diarrhoea	232 (15.9)	47 (20.3)
Vomiting	230 (15.7)	42 (18.3)
Confusion	231 (15.8)	39 (16.9)
Ageusia	216 (14.8)	34 (15.7)
Sore throat	226 (15.5)	28 (12.4)
Anosmia	214 (14.6)	25 (11.7)
Abdominal pain	229 (15.7)	23 (10.0)
Coryza	141 (9.6)	11 (7.8)
Palpitations	141 (9.6)	7 (5.0)
Conjunctivitus	228 (15.6)	6 (2.6)
Rash/other dermatological manifestation	229 (15.7)	1 (0.4)

[8] **Respiratory** (coryza, cough, sore throat, shortness of breath, tachypnoea, chest pain); **Neurological** (ageusia, anosmia, confusion, dizziness, headache); **Gastrointestinal** (abdominal pain, diarrhoea, nausea, vomiting); **Febrile illness** (Fever, feverishness, chills); **Other** (any other symptom listed).

Section Three - Patient Outcomes

Methodology

- Cases included

  For this part of the bulletin, the analysis is limited to confirmed cases where key variables (age, sex and date of admission) were not missing. Results from FR-V are not included in the analysis presented in this section due to the small number of reported cases.

- Selection of EN cases

  Cases were selected as described in Section One; although limited to the dataset described i.e. confirmed cases where key variables were not missing.

- Selection of SC cases

  Cases were selected as described in Section Two; this is because many of the patient characteristics and outcomes variables presented are only available for cases that are included in the enhanced surveillance dataset.

- Selection of second/third wave cases

  Cases belonging to the second and third waves were ascertained using the site-specific definitions. Case numbers were plotted over time for each site (February 2020–June 2021), see Appendix 1.4 for site-specific graphs describing the number of cases over time. Each graph was visually inspected to detect a resurgence of COVID-19 cases in the "second and third waves", and the week this occurred noted for each site (see Appendix 1.4). For the subsequent analyses, only cases reported from these specific weeks onwards are included. Table 8 describes the contribution of the data by site for each wave.

Table 8 European countries participating in I-MOVE-COVID-19 (WP3) European hospital surveillance, second and third waves (06 June 2020 to 30 June 2021) and their respective contribution to this report

Country	Region	Participating hospitals	Number of cases in second wave (%)	Number of cases in third wave (%)	Admission of first reported case: second wave		Admission of first reported case: third wave		Admission of last reported case	
					Date	Week	Date	Week	Date	Week
Albania (AL)	-	Two hospitals	66 (1)	1,145 (33)	06 Jun 2020	23	01 Sep 2020	36	28 Feb 2021	8
Belgium (BE)	-	One hospital	559 (5)	343 (10)	04 Aug 2020	32	26 Jan 2021	04	25 Jun 2021	25
England (EN)	Nationwide	Randomly selected from 53 sentinel hospitals	3,157 (26)	111 (3)	01 Sep 2020	36	26 Apr 2021	17	30 Jun 2021	26
France (FR)	Two sites:									
	FR-R (REIVAC)	Five hospitals	472 (4)	- (-)	05 Jan 2021	01	-	-	-	-
	FR-V (ViVI)	Two hospitals	- (-)	- (-)	-	-	-	-	-	-
Lithuania (LT)	-	Two hospitals	278 (2)	78 (2)	13 Jul 2020	29	16 Feb 2021	07	25 May 2021	21
Portugal (PT)	-	Three hospitals, all wards	191 (2)	55 (2)	13 Oct 2020	42	16 May 2021	19	30 Jun 2021	26
Romania (RO)	-	Two hospitals, all wards	26 (0)	188 (5)	15 Jul 2020	29	10 Sep 2020	37	03 May 2021	18
Scotland (SC)	Nationwide	All hospitals	4,262 (35)	345 (10)	29 Jul 2020	31	04 May 2021	18	30 Jun 2021	26
Spain	Two sites:									
	ES	Two hospitals	514 (4)	391 (11)	08 Jun 2020	24	07 Dec 2020	50	22 Jun 2021	25
	NA	Navarra region: six hospitals	2,771 (23)	788 (23)	21 Jul 2020	30	01 Mar 2021	09	19 Jun 2021	24
Total			**12,296**	**3,444**	**06 Jun 2020**	**23**	**01 Sep 2020**	**36**	**30 Jun 2021**	**26**

Length of stay, ICU admission and deaths

- Over all sites, the median **length of stay** in hospital was **eight days**, range 1–83 (n=1,592)
- Over all sites, **16%** of hospitalised cases required **ICU/HDU admission.**
- Over all sites**, 8%** of hospitalised cases **died in hospital**.

Figure 9 shows patient outcome by sex. Note that all patients are included in the figure, even if outcome is yet to be determined (as may be the situation, for example, for more recent admissions). Most patients admitted to hospital were discharged (87%), eight percent of the hospitalised patients died and more deaths occurred among men (9%) than woman (7%). A small number of patients were still on treatment in hospital (4%) and an equal proportion of males and females had an unknown outcome.

Figure 9 **Patient outcome by sex, by all sites, 01 April to 30 June 2021**

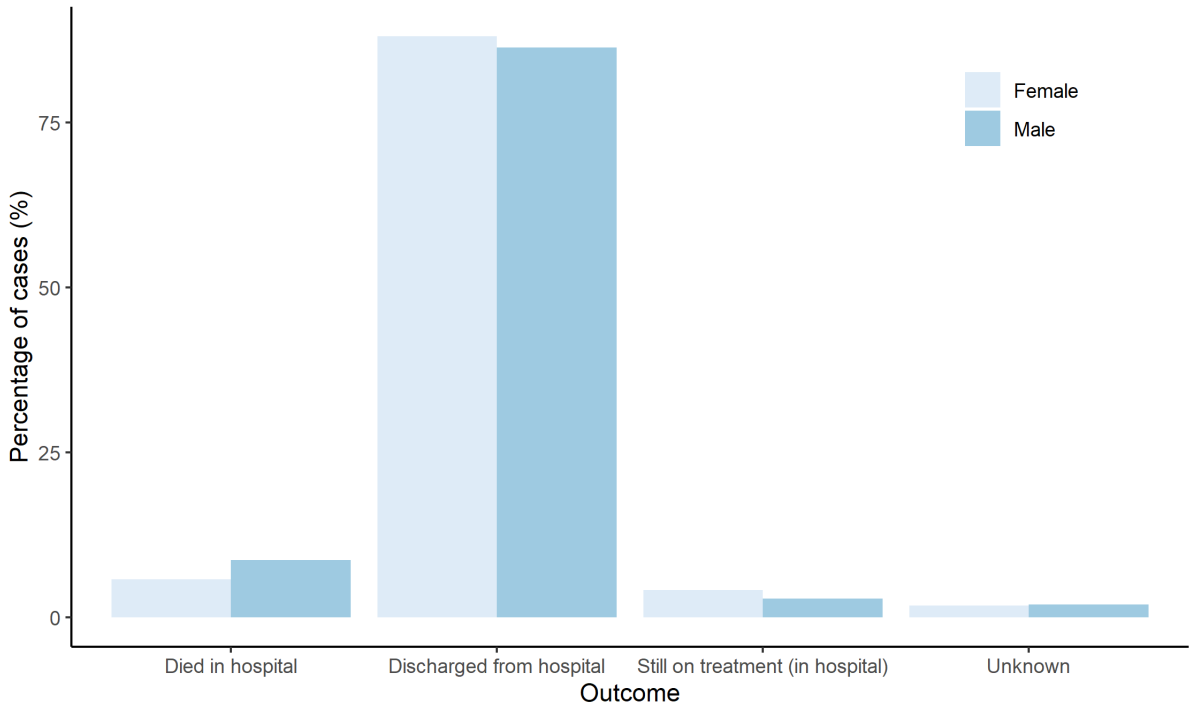


Table 9 shows the trends over time in outcomes. Since February 2020, the median length of hospital stay has decreased from 11 days to eight days in the latest quarter to the end June 2021. The number and proportion of ICU/HDU admissions dropped from 19.9% to 9.1% in the summer of 2020. The proportion, however, increased through each subsequent quarter to 15.5% to the end June 2021, while the overall number at this time is lower than that recorded since the summer 2020.
There has been a notable decrease in deaths among hospitalised cases since February 2020, with 135 (7.6%) recorded between April and June 2021.

The observed decreases in hospital admissions and length of stay are likely multi-factorial. The implementation of the vaccine programme has been linked to a reduction of hospital admissions. While infection is still possible among those who have been vaccinated, for many this results in the occurrence of less severe disease resulting in a reduction in hospitalisation and death rates, notwithstanding the circulation of virus variants that are highly transmissible, such as the Delta variant, first detected in India in December 2020 and the most predominant circulating strain in most parts of Europe from spring

2021[9]. We note that the vaccination programme is at different stages of roll out across participating countries. Treatment and therapy for COVID-19 has also improved over time, which has resulted in an improvement of survival and possibly reduced hospital stays for some patients. There are also more treatment options available for patients outside of hospital which could have led to the reduction of hospital days.

Table 9 Trends in outcomes per quarter for all sites, 01 February 2020 – 30 June 2021.

Time Period Begins	Time Period Ends	Median Length of Hospital Stay (days)	Number of ICU/HDU admissions (%)	Number of deaths (%)
01 Feb 2020	31 Mar 2020	11	710 (19.9)	820 (22.9)
01 Apr 2020	30 Jun 2020	10	676 (14.4)	1,126 (24.1)
01 Jun 2020	30 Sep 2020	9	144 (9.1)	222 (14.0)
01 Oct 2020	31 Dec 2020	9.5	785 (12.8)	1,295 (21)
01 Jan 2021	31 Mar 2021	9	756 (15.3)	924 (18.8)
01 Apr 2021	30 Jun 2021	8	281 (15.5)	135 (7.6)

Table 10 describes patient outcomes (ICU/HDU admissions; deaths) by a range of potential risk/protective factors. The majority of those admitted to ICU/HDU were those aged 45–64 years. From the information available there were few health care workers or pregnant women in the hospitalised cohort. Among those hospitalised, in ICU/HDU or who died, for whom there were data on smoking status, 58%, 58% and 57% indicated they were a non-smoker, respectively.

A higher proportion of those in hospital who were identified as a close contact of a case were also admitted to ICU/HDU and also died. The majority of hospitalised cases were admitted between five and nine days after symptom onset.

[9] Lopez Bernal J, Andrews N, Gower C, Gallagher E, Simmons R, Thelwall S, Stowe J, Tessier E, Groves N, Dabrera G, Myers R. Effectiveness of Covid-19 vaccines against the B. 1.617. 2 (Delta) variant. N Engl J Med. 2021:585-94.

Table 10 Patient outcome of hospitalised cases by potential protective/risk factors, 01 April to 30 June 2021.

Exposures (risk/protective factors)	Total cases		ICU/HDU admission		Deaths	
	N	%	N	%	N	%
All cases[10]	1,462	-	246	16.9	126	8.6
Missing data	-	-	<10	<1.0	<10	<1.0
Age groups (years)						
0–14	25	1.7	<10	*	<10	<1.0
15–44	281	19.2	32	13.0	<10	<1.0
45–64	591	40.4	114	46.3	17	13.5
65–74	280	19.2	75	30.5	37	29.4
≥ 75	285	19.5	24	*	69	54.8
Sex						
Female	637	43.6	85	34.6	45	35.7
Male	825	56.4	161	65.4	81	64.3
Healthcare worker						
Yes	<10	*	-	-	<10	*
No	1,102	*	186	100	105	*
Missing data	356	24.4	357	-	-	-
Smoker						
Yes	322	42.1	62	41.6	35	43.2
No	443	57.9	87	58.4	46	56.8
Missing data	697	47.7	697	-	697	-
Pregnant (women only)						
Yes	15	3	<10	*	-	-
No	482	97	70	*	35	100
Missing data	140	22	140	-	140	-
Close contact setting[11]						
Yes	952	88.2	165	83.3	86	89.6
No	127	11.8	33	16.7	10	10.4
Missing data	383	26.2	-	-	384	-
Days between onset and hospitalisation						
0–4	399	28.9	57	23.9	48	41
5–9	639	46.3	134	56.3	44	37.6
10+	325	23.5	45	*	22	*
Onset in hospital	18	1.3	<10	*	<10	*
Missing data	81	5.5	88	-	-	-

[10] Only data for the confirmed cases where age, sex and date of admission are not missing

[11] If the patient is a contact of a COVID-19 case

* Indicates values which have been suppressed due to the potential risk of disclosure and to help maintain confidentiality

Table 11 describes patient requirement for ventilation for a range of risk/protective factors, for all sites between 01 April and 30 June 2021. Information on ventilation status has poor completeness level (43% of any type of ventilation data is missing) and analysis should therefore be carefully considered. The majority of the patients where information on mechanical ventilation was known and who required any type of mechanical ventilation were aged 45 to 64 years (42%). This was similar for those requiring non-invasive ventilation with 51% being aged 45 to 64 years; however, for those requiring invasive ventilation, the majority (40%) were aged 65 to 74 years. Between April and June 2021, over one quarter of men (28%) required any level of ventilation compared to 22% of women.

A very small proportion of hospitalised healthcare workers and pregnant women required any type of ventilation (n<10). Overall, 42% of those admitted to hospital requiring any type of ventilation were smokers. Smoking has been associated with poorer outcomes in relation to COVID-19 and tend to have a more severe clinical course. The majority of hospitalised patients who required any type of ventilation had previously been in close contact with another COVID-19 case (88%) and only a very small number of admitted patients who required ventilation acquired their infection in hospital (1%).

Table 11 Level of mechanical ventilation required by hospitalised patients by risk/protective group, 01 April to 30 June 2021

Exposures (risk/protective) factors)	Total N(%)	Any ventilation n (%)	Ventilator (non-invasive) n (%)	Ventilator (invasive) n (%)	High flow oxygen n (%)	ECMO n (%)	Other n (%)
All cases[12]	1,462	373 (44.4)	83 (9.9)	74 (8.8)	122 (14.5)	10 (1.2)	87 (11)
Missing ventilation data	-	621 (42.5)	622 (42.5)	622 (42.5)	622 (42.5)	622 (42.5)	669 (45.8)
Age groups							
0–44	306 (20.9)	66 (17.7)	17 (20.5)	10 (*)	20 (16.4)	- (-)	19 (21.8)
45-64	591 (40.4)	156 (41.8)	42 (50.6)	27 (36.5)	51 (41.8)	<10 (*)	28 (32.2)
65–74	280 (19.2)	84 (22.5)	15 (*)	30 (40.5)	22 (18.0)	- (*)	21 (24.1)
75+	285 (19.5)	67 (18.0)	<10 (*)	<10 (*)	29 (23.8)	<10 (-)	19 (21.8)
Sex							
Female	637 (43.6)	141 (37.8)	35 (42.2)	24 (32.4)	47 (38.5)	<10 (*)	33 (37.9)
Male	825 (56.4)	232 (62.2)	48 (57.8)	50 (67.6)	75 (61.5)	<10 (*)	54 (62.1)
Healthcare worker							
Yes	<10 (*)	<10 (*)	<10 (*)	- (-)	- (-)	- (-)	- (-)
No	1,102 (*)	192 (*)	23 (*)	55 (100)	83 (100)	<10 (100)	31 (100)
Smoker							
Yes	322 (42.1)	106 (41.6)	24 (43.6)	19 (38.0)	38 (39.6)	<10 (*)	22 (41.5)
No	443 (57.9)	149 (58.4)	31 (56.4)	31 (62.0)	58 (60.4)	<10 (*)	31 (58.5)
Pregnant (women only)							
Yes	15 (3.0)	<10 (*)	<10 (*)	- (-)	- (-)	- (-)	- (-)
No	482 (97.0)	113 (*)	32 (*)	18 (100)	37 (100)	<10 (100)	25 (100)
Close contact setting[13]							
Yes	952 (88.2)	159 (69.1)	41 (73.2)	41 (75.9)	55 (66.3)	<10 (*)	22 (57.9)
No	127 (11.8)	71 (30.9)	15 (26.8)	13 (24.1)	28 (33.7)	<10 (*)	16 (42.1)
Days between onset hospitalisation							
0–4	399 (28.9)	103 (29.2)	20 (24.7)	22 (31.0)	26 (21.8)	<10 (*)	33 (44.6)
5–9	639 (46.3)	189 (53.5)	41 (50.6)	38 (53.5)	77 (64.7)	<10 (*)	30 (40.5)
10+	325 (23.5)	57 (*)	19 (*)	11 (15.5)	14 (*)	<10 (*)	10 (*)
Onset in hospital	18 (1.3)	<10 (*)	<10 (*)	- (-)	<10 (*)	<10 (*)	<10 (*)

[12] Only data for the confirmed cases where age, sex and date of admission are not missing

[13] If the patient is a close contact of a COVID-19 case

* Indicates values which have been suppressed due to the potential risk of disclosure and to help maintain confidentiality

Comparison of patient outcome in second and third epidemic waves

Table 12 compares the percentage of ICU admissions and deaths amongst patient groups in the second versus the third wave as defined using site-specific definitions as described in the methodology for section three above. The wave analysis shows a statistically significant decrease in ICU/HDU admissions in women and men ($p<0.01$). The number of deaths have also significantly decreased in both males and females ($p<0.01$) and in all age groups except those under 14 years ($p=0.63$).

Table 12 Second and third wave of the COVID-19 by hospital admissions, ICU/HDU admissions and deaths

	Second wave			Third wave			P value (Chi-squared test of proportions, 2nd wave v. 3rd wave)	
	Hospital admissions (N)	ICU/HDU (n/%)	Death (n/%)	Hospital admissions (N)	ICU/HDU (n/%)	Death (n/%)	ICU/HDU admissions	Deaths
				OVERALL				
All cases[14]	12,098	1,574 (13)	2,328 (19)	2,288	382 (17)	205 (9)	<0.00001	<0.00001
				SEX				
Male	5,750	560 (10)	967 (17)	1,010	141 (14)	71 (7)	<0.00001	<0.00001
Female	6,348	1,014 (16)	1,361 (21)	1,278	241 (19)	134 (10)	0.0084	<0.00001
				AGE GROUP (years)				
0-14	154	<10 (*)	<10 (*)	43	<10 (*)	<10 (*)	0.51437	0.62685
15-44	1,535	164 (11)	30 (2)	465	53 (11)	<10 (*)	0.64684	0.02174
45-64	3,597	702 (20)	248 (7)	871	162 (19)	27 (3)	0.64237	0.00003
65-74	2,243	451 (20)	493 (22)	422	122 (29)	52 (12)	0.00005	<0.00001
75+	4,569	250 (7)	1,555 (34)	487	44 (9)	123 (25)	0.00127	0.00012

[14] Only data for the confirmed cases where age, sex, ICU(status) and outcome are not missing

* Indicates values which have been suppressed due to the potential risk of disclosure and to help maintain confidentiality

Strengths of I-MOVE-COVID19 hospital surveillance

The I-MOVE-COVID-19 hospital surveillance network complements and enhances national-level COVID-19 surveillance and by the pooling and analyses data from multiple surveillance sites across Europe, provides epidemic intelligence on SARS-CoV-2 hospitalisation across the European region. As sites follow the same protocol, this provides a relatively homogeneous dataset of greater sample size, which in turn allows for more in-depth investigation of the data (e.g. by stratification into smaller sub-groups), facilitating epidemiological insights at a European regional level. Participation in the surveillance system also allows sites to share their experience with other European colleagues in the network, providing a wider context for their national data. Importantly, for some sites, network participation has led to improvements in national level data collection systems and practice, e.g. through data linkage or digitalisation of hospital data. Network members also report a positive effect of the regular surveillance bulletin meetings, which provide feedback on the data collected and the opportunity for discussion with other network members.

Limitations

Nonetheless, the surveillance has a number of limitations. The definition of a confirmed case potentially includes patients who were hospitalised during the surveillance period for reasons other than COVID-19, but who were incidentally swab positive for SARS-CoV2 prior to (within 14 days), during or after admission. This may bias the results e.g. in favour of less severe outcomes.

Intra- and inter-country/site reporting practice and completeness of data varies over time, which means that comparisons both within and between sites should be interpreted with caution. The timeframe during which data were submitted by participating sites reflect the logistical constraints faced by those sites. Thus, it may not reflect how the epidemic progressed in those countries over time. In addition, containment, case management and mitigation strategies for the COVID-19 pandemic have differed both within and between countries over time. For this reason, alongside the collection of dates of onset/admission/respiratory specimen collection, case-containment/mitigation strategies (including roll out of vaccine programmes) and dates of any changes should be considered for each country when interpreting the data.

Data for patient outcome have not been time censored. This may introduce bias into the report findings by including recently hospitalised patients for whom outcome is not yet determined.

The Scottish data in Sections Two and Three are selected from an enhanced surveillance dataset set up for research purposes, which is only available for a small proportion (22%) of all patients hospitalised with COVID-19 in Scotland. These data have been shown to be biased towards older ages and more severe outcomes (higher proportion ICU/HDU admissions and deaths) when compared to overall COVID-19 admissions in Scotland. Therefore, the clinical characteristics and patient outcomes may not

be representative of all hospitalised Scottish patients, potentially introducing bias into the pooled sample.

Appendix

1.1. Appendix A. The I-MOVE-COVID-19 project

1.1.1. Background

The I-MOVE (Influenza – Monitoring Vaccine Effectiveness in Europe) project was initiated in 2007 and was the first network to monitor influenza vaccine effectiveness (VE) within Europe. The network has two components: one for primary care practices, recruiting patients with influenza-like illness (ILI) and the other for hospitals, recruiting patients with severe acute respiratory illness (SARI).

The emergence of a novel coronavirus – (SARS-CoV-2) – occurred at the end of 2019, causing a new coronavirus disease, COVID-19. As of the 1st September 2021, there had been 216,867,420 confirmed cases of COVID-19 globally, including 4,507,837 deaths, reported to the World Health Organization.[15]

In February 2020, partners already involved in studies within the I-MOVE network came together as the I-MOVE-COVID-19 consortium and successfully bid for the European Commission H2020 call on "Advancing knowledge for the clinical and public health response to the novel coronavirus epidemic". The expanded network includes primary care networks, hospitals, and national laboratory reference centres in 13 countries across the WHO European Region.[16]

The I-MOVE-COVID-19 consortium aims to obtain epidemiological and clinical information on patients with COVID-19 as well as virological information on SARS-CoV-2, and provide the following through different work packages (WPs): (a) provision of a flexible surveillance platform, adaptable to the epidemiological situation, through WP2 (primary care surveillance) and WP3 (hospital surveillance), (b) research studies, through WP4 and (c) evaluation of public health interventions (e.g. vaccination, antivirals) in WP2–4, in order to contribute to the knowledge base, guide patient management, and inform the public health response.

The WP3 hospital surveillance for COVID-19 is coordinated by Public Health Scotland (PHS) with Epiconcept support. The hospital network comprises 11 surveillance sites involving hospitals in six EU Member States,[17] England, Scotland, and Albania (with two of the EU member state countries having two sites each). While each of the surveillance sites can analyse their data separately, pooling the data for overall analysis provides a sample size big enough to depict trends and generate hypotheses (surveillance) and answer study questions with reasonable precision (research).

This document presents the fourth surveillance bulletin for the hospital-based surveillance component of I-MOVE-COVID-19 for 2020. The specifics of each site's COVID-19 data collection are detailed in the individual site protocol appendices.

1.1.2. Objectives of the I-MOVE-COVID-19 WP3 Surveillance

[15] Source: World Health Organization (WHO) Situation Report dashboard. Available at: https://covid19.who.int/. Accessed 01 September 2021.

[16] Albania Belgium, Croatia, France, Germany, Ireland, Lithuania, the Netherlands, Portugal, Romania, Spain, Sweden and the UK (England and Scotland).

[17] Belgium, France, Lithuania, Portugal, Romania, and Spain

Primary objectives

The main objective of the I-MOVE-COVID19 WP3 project is to describe, for nine European countries, clinical and epidemiological characteristics of patients hospitalised with COVID-19 and virological characteristics of SARS-CoV-2 in hospitalised patients, in order to contribute to the knowledge base, guide patient management, and inform the public health response.

Secondary objectives

Potential secondary objectives include:

- To strengthen preparedness to respond to COVID-19 through hospital surveillance.
- To describe COVID-19 suspected, probable and confirmed cases with severe disease by sex, age-group, and other potential risk or protective factors.
- To describe deaths from COVID-19 in hospital by country and pooled across the network.
- To measure the incidence of hospitalised COVID-19 patients, by participating region/country (where appropriate) in order to measure the impact of/inform decisions on mitigation measures, and to identify at-risk groups for severe disease.

1.2. Appendix B. Methods

1.2.1. Active hospital-based surveillance of COVID-19 at European level

Type of surveillance

- Multi-centre population-based surveillance over several countries/regions

Population under surveillance

- The surveillance population consists of the entire population living in the catchment areas of the participating hospitals.

1.2.2. Surveillance and study period

The surveillance period started in February 2020. Participating hospitals carry out surveillance throughout the year. This fourth surveillance bulletin is for the period from 07 May 2020 to 31 March 2021.

1.2.3. Outcomes

The two primary outcomes of interest are laboratory-confirmed COVID-19 in patients hospitalised with suspected COVID-19, and severe COVID-19 in patients hospitalised with suspected COVID-19.

The secondary outcomes of interest are:

- Suspected COVID-19 cases
- Probable COVID-19 cases

1.3. Appendix C. Case definitions

Hospitalised patient

A hospitalised patient is defined as a patient who has been admitted to one of the participating hospitals during the surveillance period, and has not been discharged home or home-equivalent before 24h.

Suspected COVID-19 patient

A suspected COVID-19 patient is defined as a hospitalised person with:

- at least one systemic symptom or sign: fever or feverishness, malaise, headache or myalgia or deterioration of general condition (asthenia or loss of weight or anorexia or confusion or dizziness)

AND

- at least one respiratory symptom or sign (cough, sore throat or shortness of breath; or tachypnoea or signs of low oxygen saturation)

at admission or within 48 hours after admission.

All patients fulfilling the above criteria, until they are re-classified as COVID-19 negative, probable or confirmed (see below), are considered as suspected COVID-19 patients.

Confirmed case of COVID-19 (confirmed case)

A confirmed COVID-19 is defined as a patient hospitalised during the surveillance period with a respiratory sample positive for SARS-CoV-2.

Probable case of COVID-19 (probable case)

A probable COVID-19 case will be defined as a patient hospitalised with suspected COVID-19 during the surveillance period for whom

- testing for virus causing COVID-19 is inconclusive (according to the test results reported by the laboratory)

OR

- testing was positive on a pan-coronavirus assay

OR

- no laboratory tests are available but there is clinical confirmation with suggestive radiology

Severe COVID-19 case

For the purposes of surveillance, all patients hospitalised due to confirmed COVID-19 disease are severe COVID-19 cases. However, these hospitalised patients will be further classified as “severe hospitalised COVID-19 patients” if they have any of the following clinically, analytically or radiologically significant alterations/outcomes mentioned in the admission or discharge diagnosis:

- Bilateral pneumonia with ground-glass opacities
- Admitted to ICU/HDU

- On ventilation
    - Invasive (i.e. with intubation)
    - non-invasive (e.g. high-flow oxygen; or those needing >6L)
- Extracorporeal membrane oxygenation (ECMO)
- Death

COVID-19 death

A COVID-19 death is defined as a confirmed COVID-19 case who died during hospitalisation.

1.3.1. Exclusion criteria for surveillance

All COVID-19 patients will be included in the surveillance unless the surveillance site/country requires consent and the patient:

- is unwilling to participate or unable to communicate and give consent (the consent may also be given by her/his legal representative, or by specific consent procedures, acceptable according to the local ethical review process)

Note: in some countries, individual patient consent is not required for routine surveillance.

1.4 Appendix D. Number of cases over time from the start of the pandemic, by site

Figures D1-D9: **Epicurves for all sites: February 2020 to June 2021**

Figure D1: England (EN)

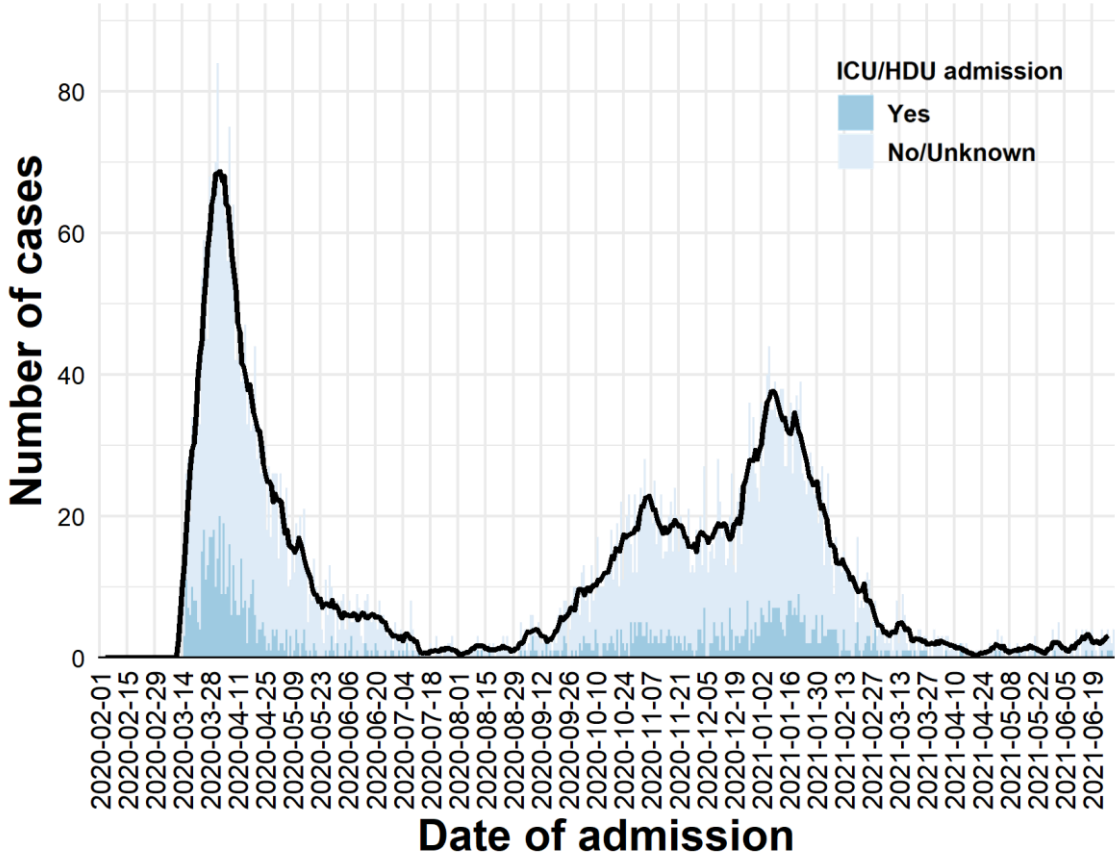


Figure D2: Scotland (SC)

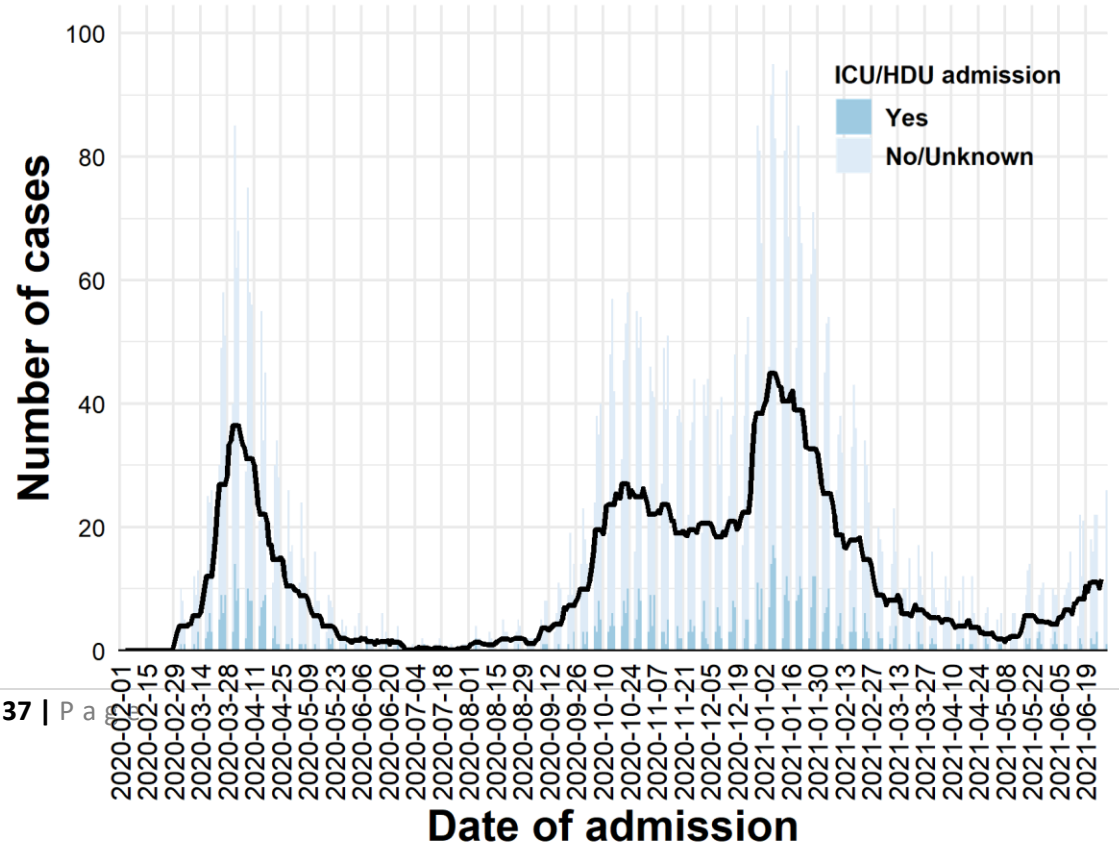


Figure D3: Belgium (BE)

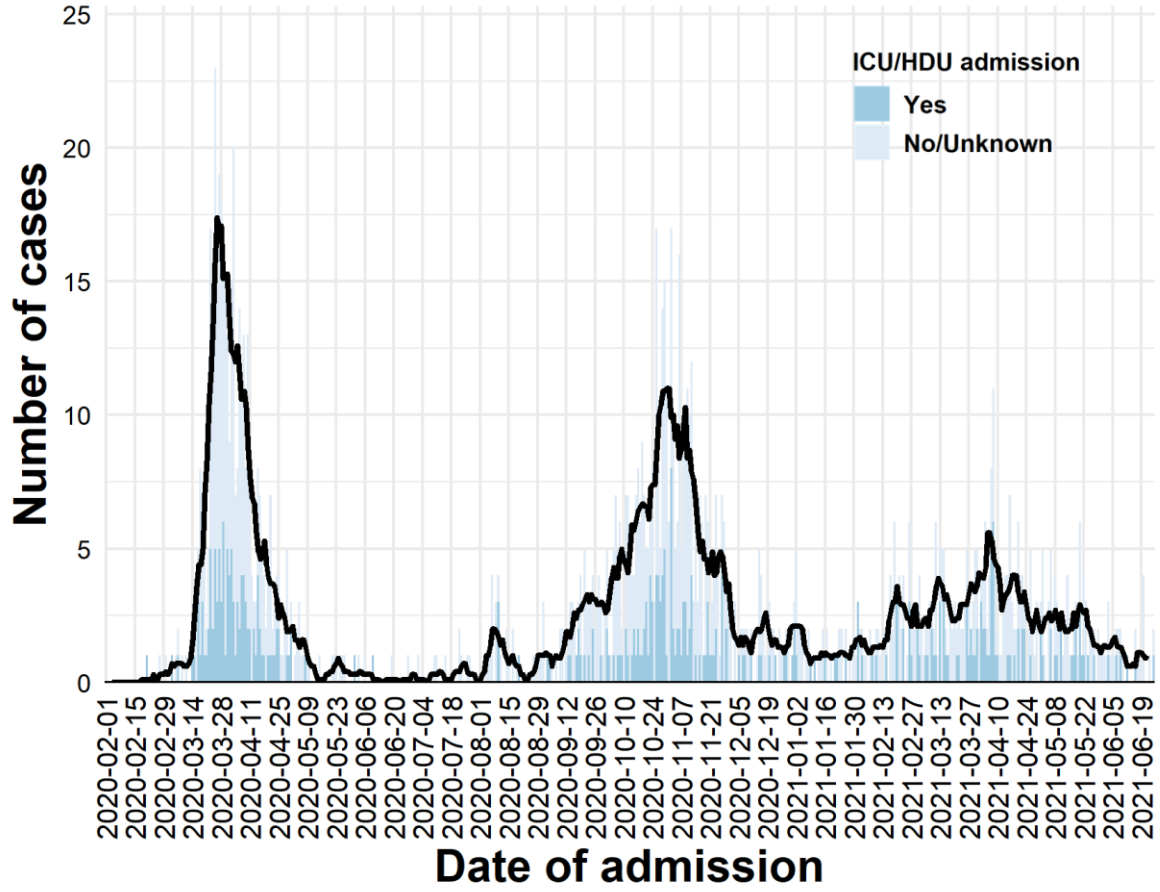


Figure D4: Portugal (PT)

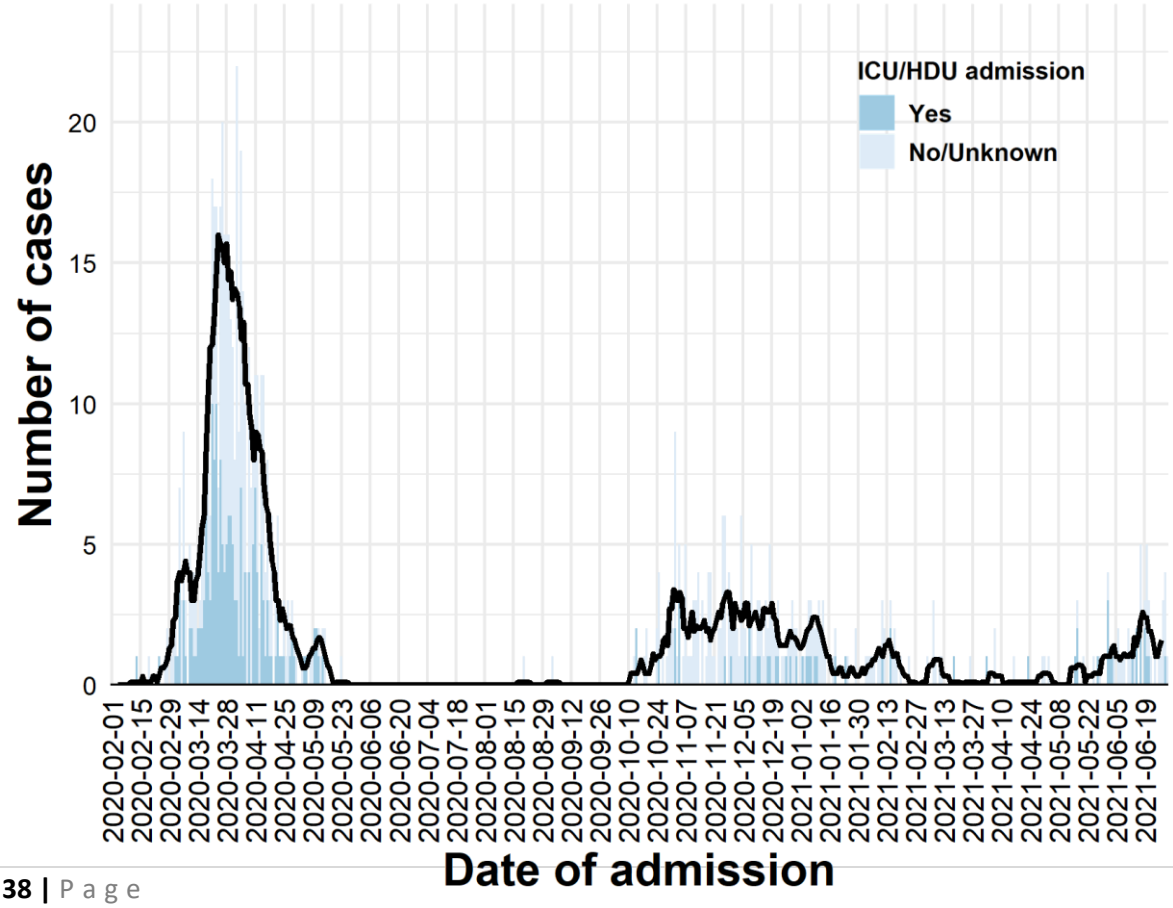


Figure D5: Spain (ES – Region of Granada and Aragon)

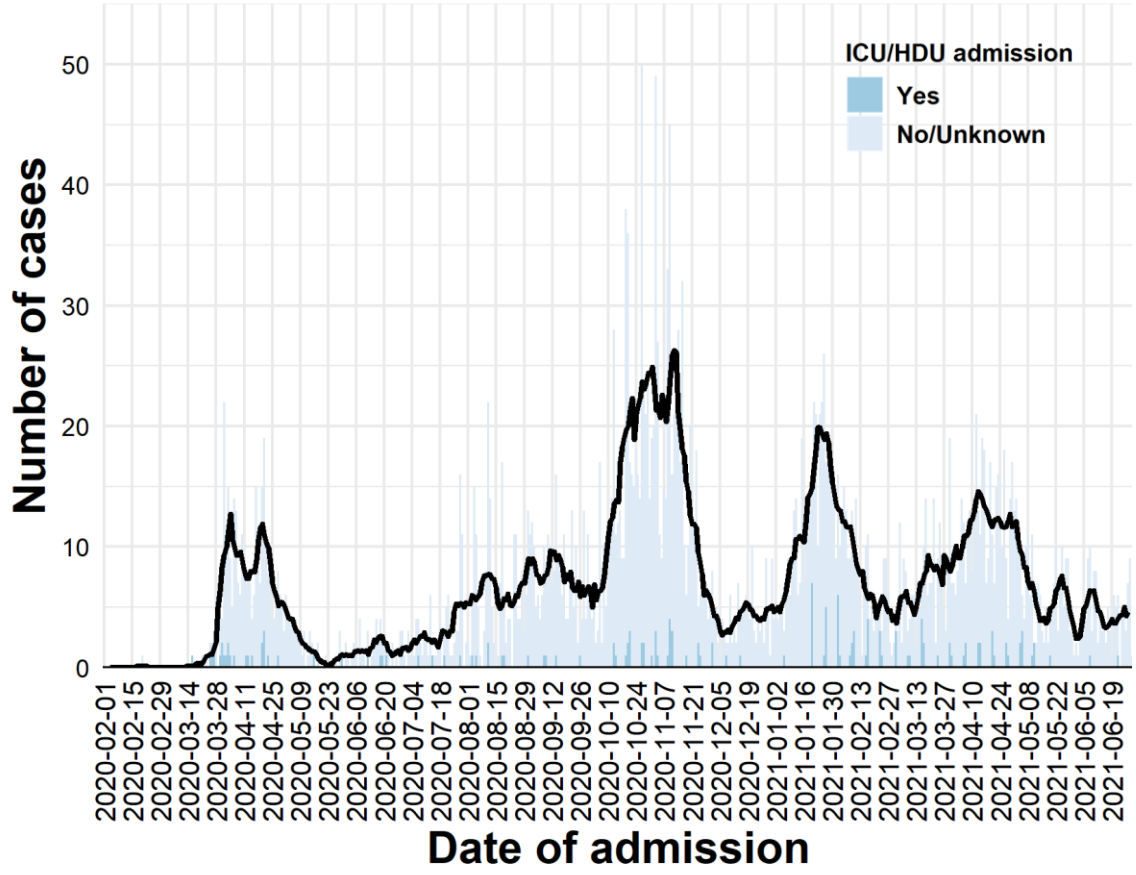


Figure D6: Spain (NA – Region of Navarra)

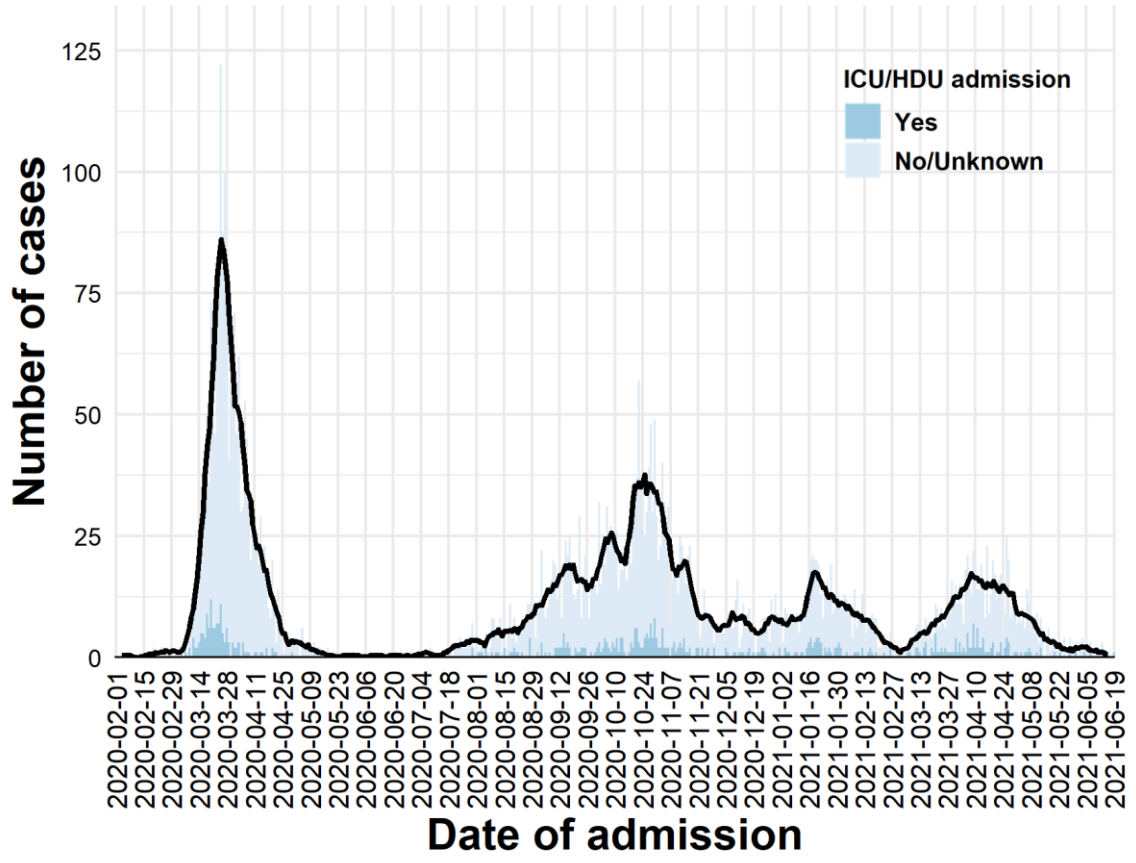


Figure D7: France I-REIVAC (FR-R)

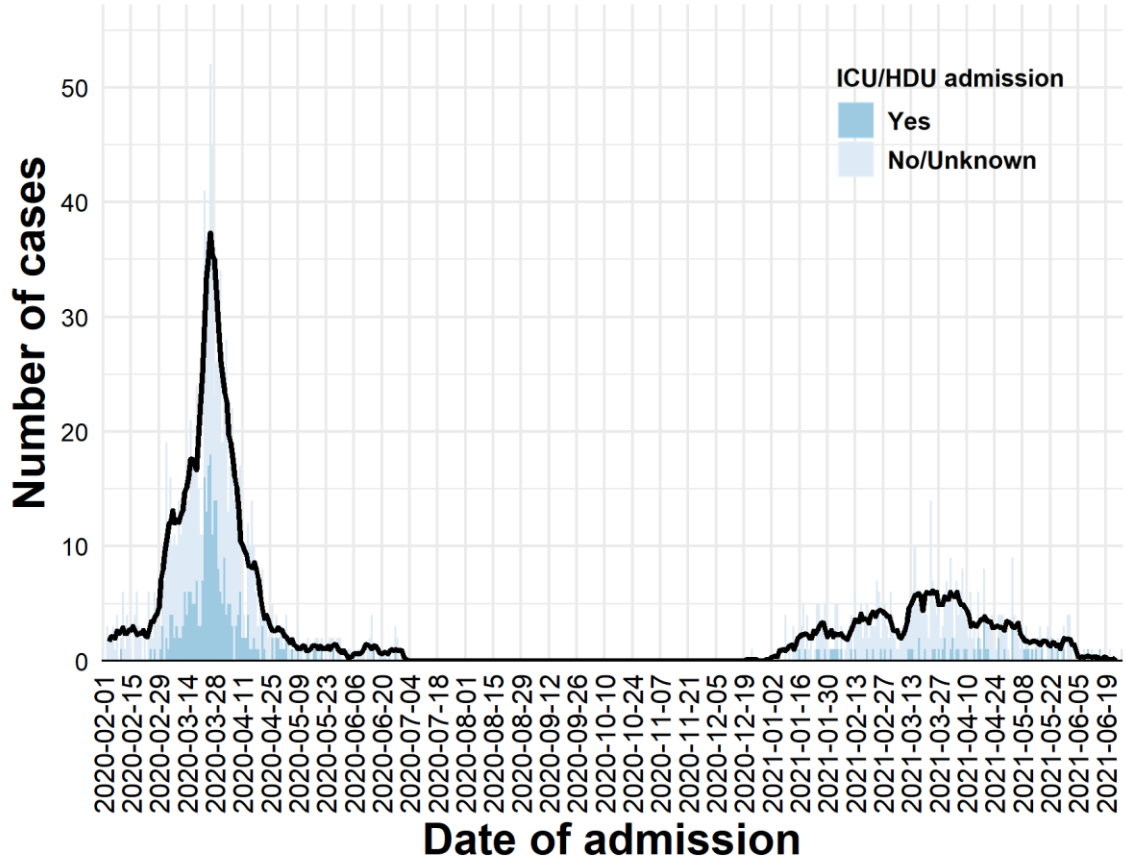


Figure D8: Lithuania (LT)

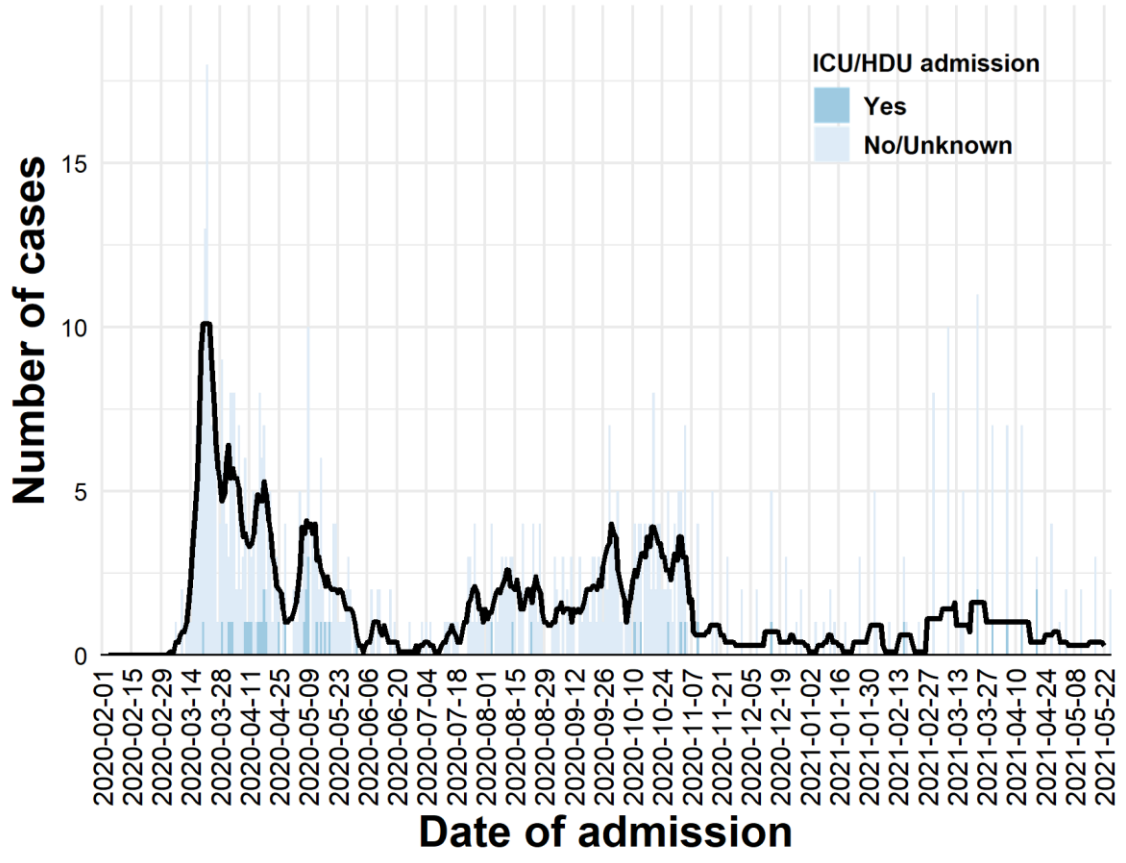
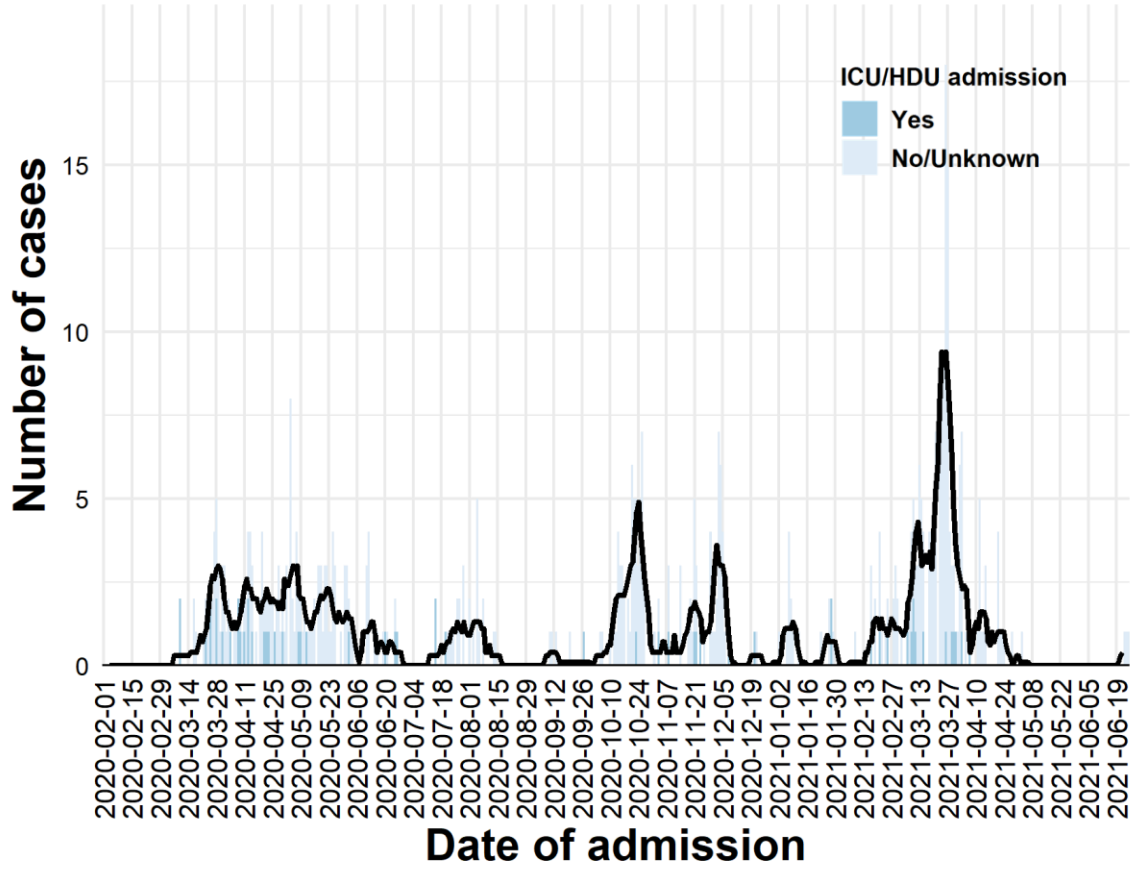


Figure D9: Romania (RO)



1.5 Appendix D. Age and sex distribution, April to June 2021 for all sites

Figures E1- E9: **Age and sex distribution of confirmed, probable and suspected COVID-19 cases by ICU/HDU admission for each country, April to June 2021.**

Figure E1: England (EN)

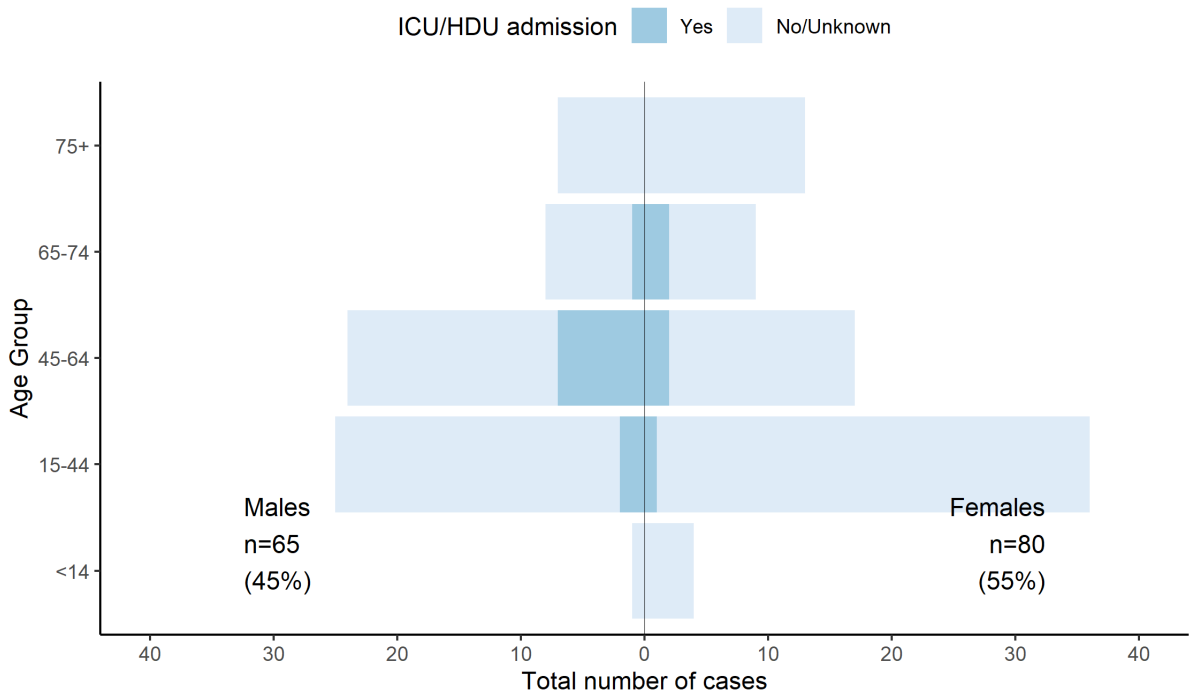


Figure E2: Scotland (SC)

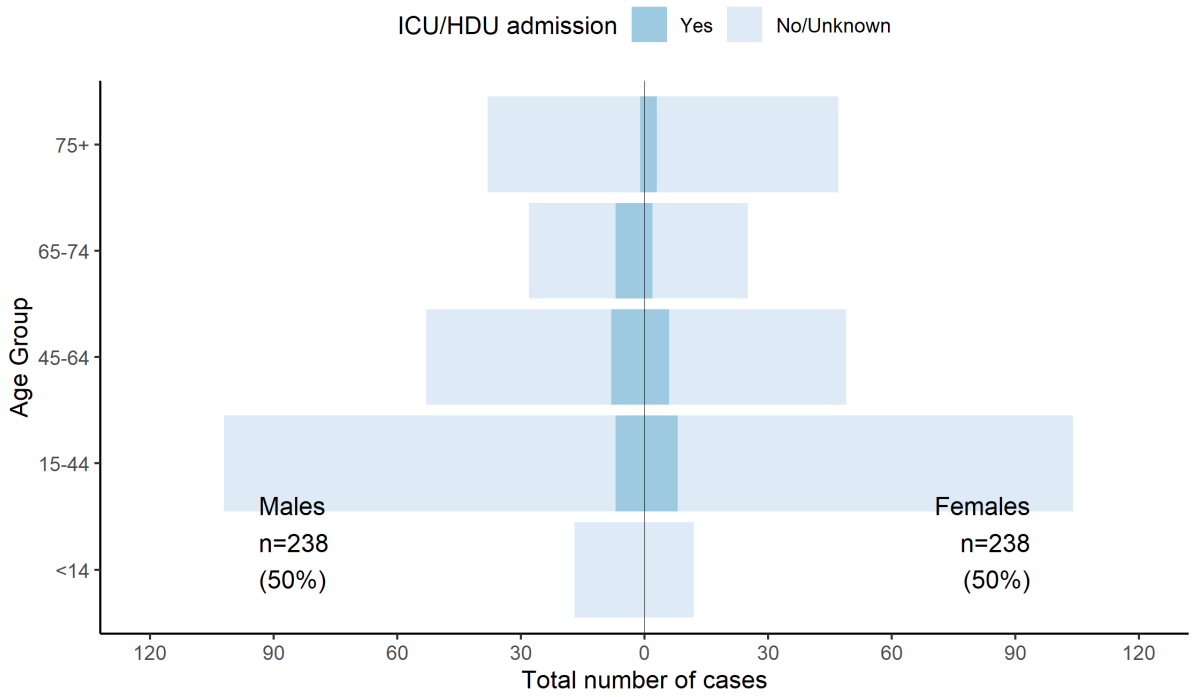


Figure E3: Belgium (BE)

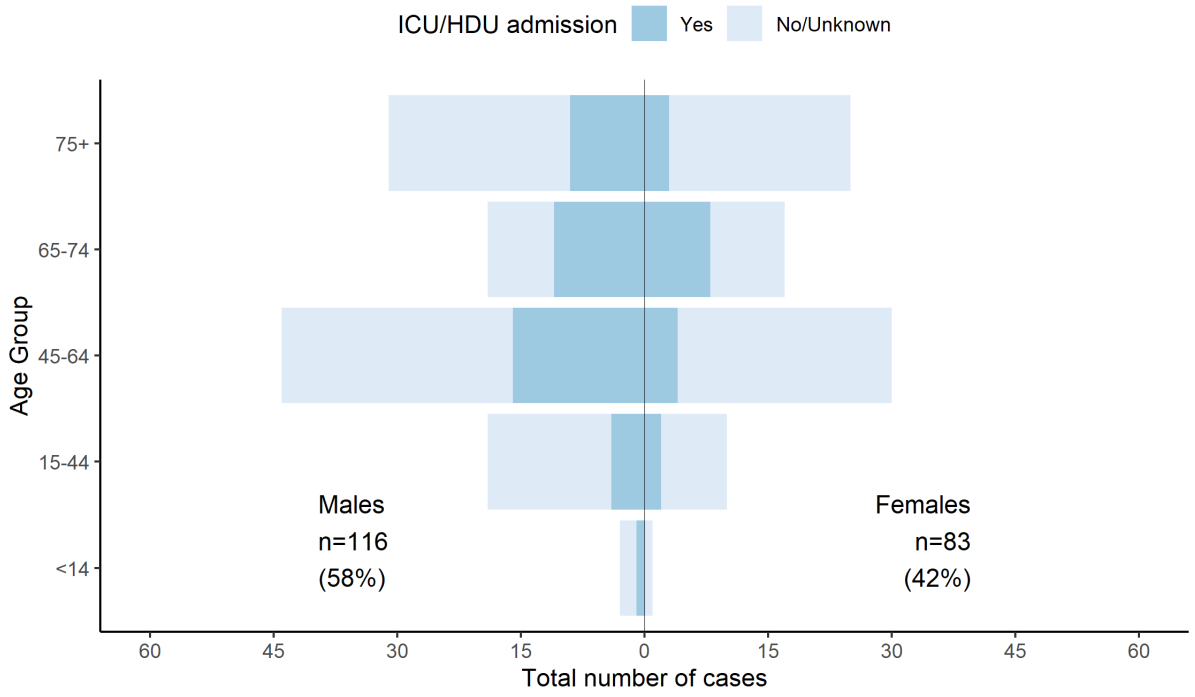


Figure E4: Portugal (PT)

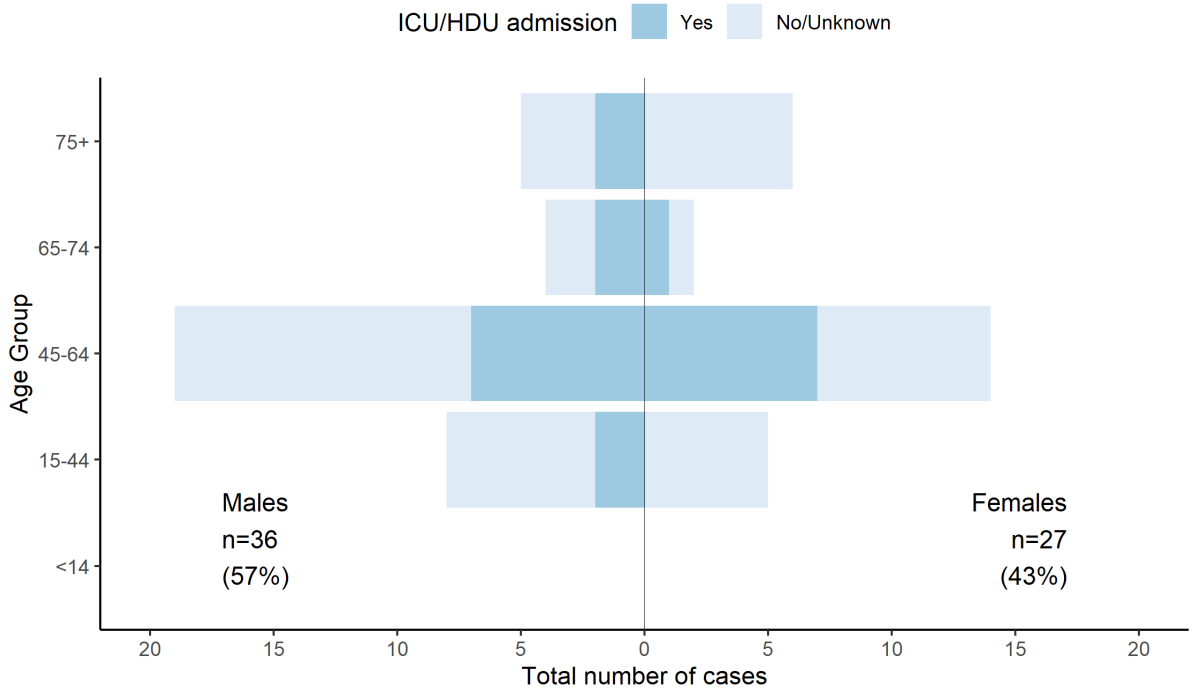


Figure E5: Spain (ES - Region of Granada and Aragon)

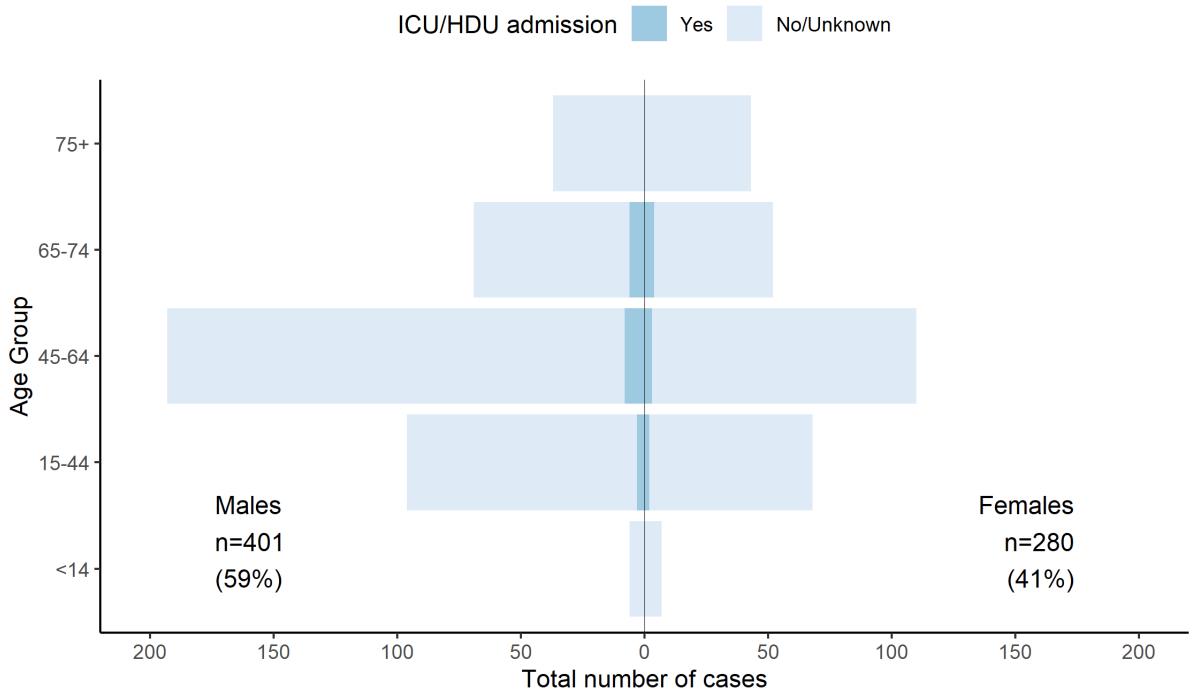


Figure E6: Spain (NA - Navarra Region)

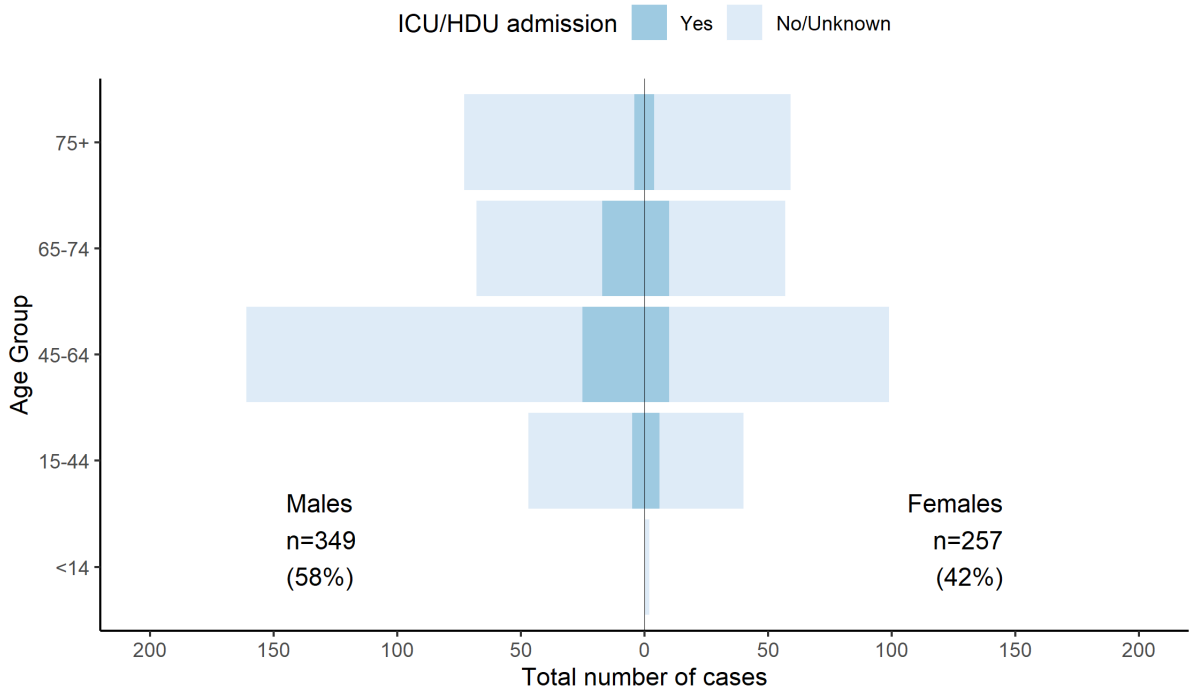


Figure E7: France I-REIVAC (FR-R)

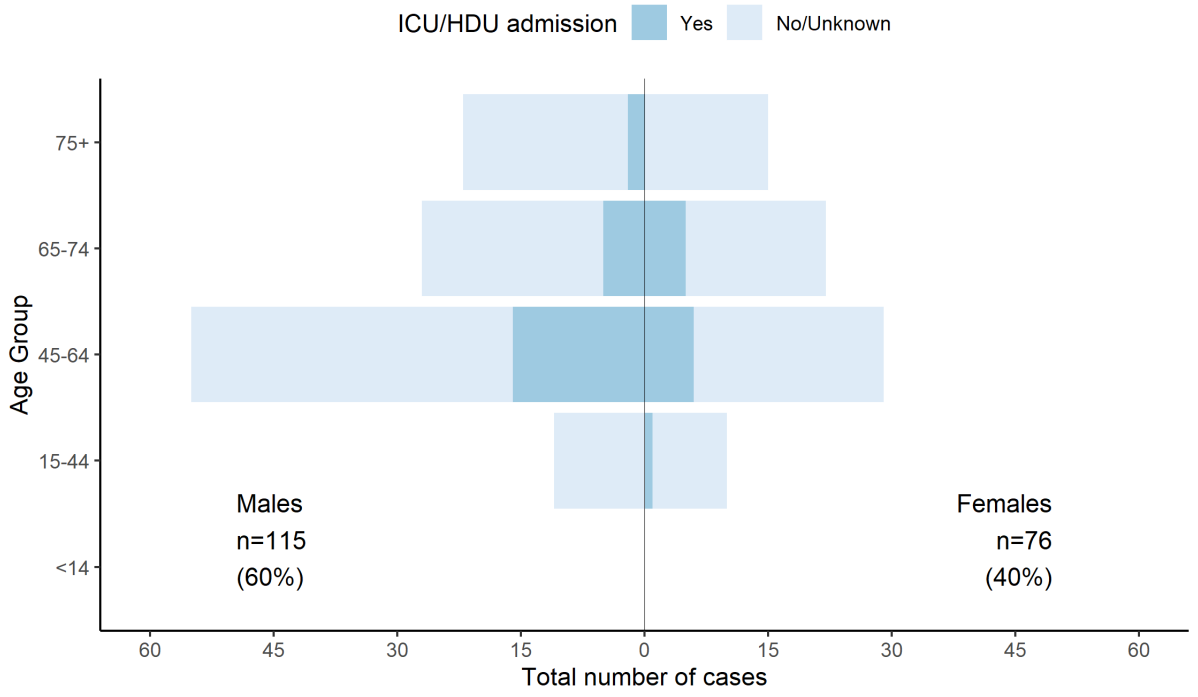


Figure E8: Lithuania (LT)

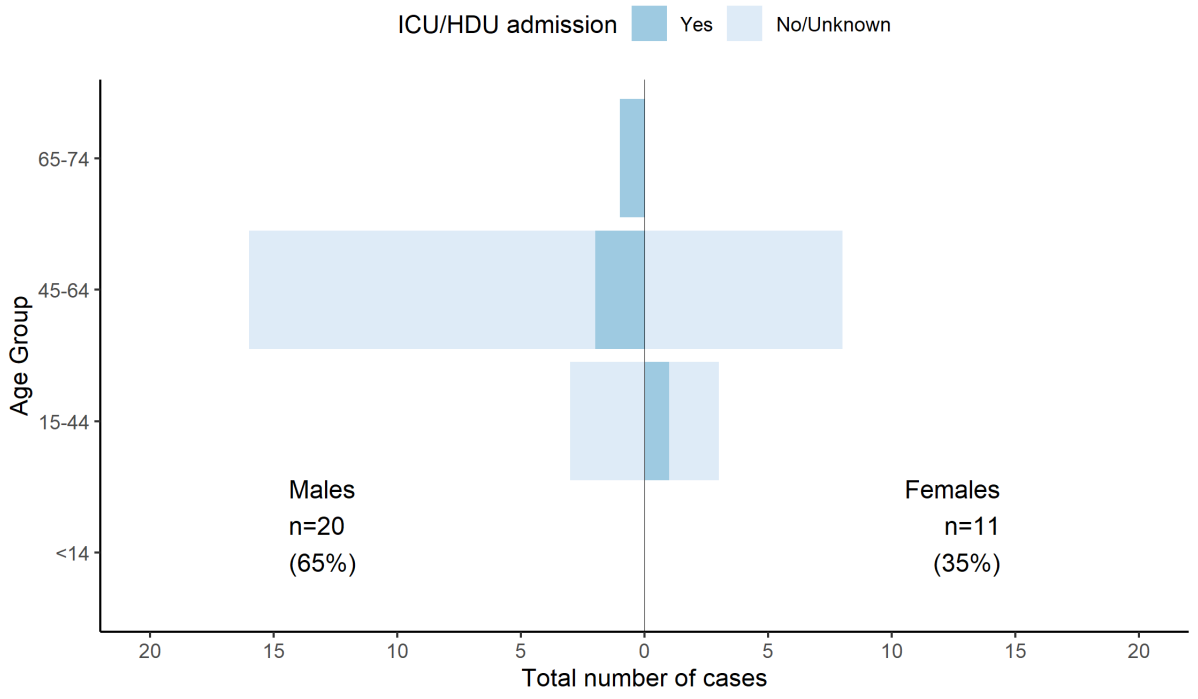
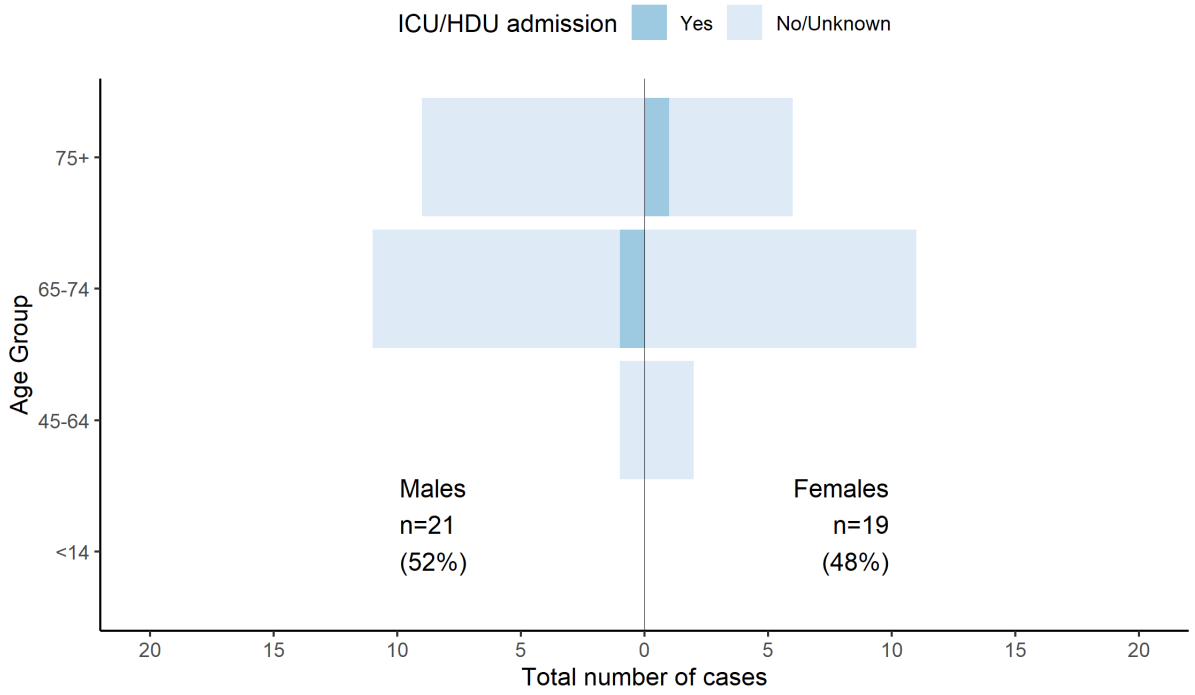


Figure E9: Romania (RO)



1.6 Appendix E. Start dates of the second and third wave for all sites

The below table outlines the start dates of the second wave and third wave for all sites as described in the methodology of Section three.

Country	Start of second wave	Start of third wave
Albania (AL)	18-05-2020	31-08-2020
Belgium (BE)	03-08-2020	25-01-2021
England (EN)	31-08-2020	26-04-2021
France (FR) - REIVAC	04-01-2021	-
France (FR) – ViVI	-	-
Lithuania (LT)	13-07-2020	15-02-2021
Portugal (PT)	12-10-2020	10-05-2021
Romania (RO)	13-07-2020	07-09-2020
Scotland (SC)	27-07-2020	03-05-2021
Spain (ES)	01-06-2020	07-12-2020
Spain – Navarra	20-07-2020	01-03-2021