Enhanced surveillance of COVID-19 in secondary care in Europe: a tale of two waves

Public Health Scotland

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Introduction

The end of 2019 saw the emergence of a novel severe acute respiratory syndrome – coronavirus 2 (SARS-CoV-2), which causes coronavirus disease 2019 (COVID-19). By the end of March 2020, there were over 400,000 cases of COVID-19 reported globally by over 150 countries, with an increasing proportion from countries in Europe (1, 2). In response to this global pandemic, the I-MOVE-COVID-19 hospital surveillance was introduced. This aims to reinforce and complement the COVID-19 epidemiological data in the EU/EEA and the UK that are compiled and reported by the European Centre for Disease Prevention and Control (ECDC) (3). The hospital network comprises 11 surveillance sites in nine European countries: Albania, England, Scotland, and six EU Member States (Belgium, France (two sites), Lithuania, Portugal, Romania, and Spain (two sites) (Figure 1).

Methodology

Data are pooled from the 11 participating sites; with two (England and Scotland) submitting national data, and the remainder being from a selection of hospitals. The data contributed by England and Scotland are over-represented and so random samples of both English and Scottish data were then selected for analysis of the different waves.

Descriptive analysis was performed on the pooled and selected dataset overall data on patients admitted from the "first wave" of the pandemic vs those admitted later ("second wave") were compared. In our wave analysis, only confirmed COVID-19 cases with a valid age, sex and date of admission were included. Case numbers were plotted over time for each site from February 2020 – March 2021 to determine where the first wave ends and where the second wave begins. Each graph was visually inspected to detect a resurgence of COVID-19 cases in the "second wave", and the week this occurred noted for each site. This allows accurate assignment of the waves for each site. This was then included in the wave analysis. The percentage of intensive care unit/high dependence unit (ICU/HDU) admissions and deaths amongst patient groups in the first versus the second wave was measured, using a Chi-squared test of proportions to test for any significant differences in the two waves.

Results

Data on 92,120 hospitalised patients were submitted for 1 February 2020 - 31 March 2021 which represents the entire dataset collected till date. Data from England tends to be skewed towards more severe outcomes (i.e. a higher percentage of ICU patients) and as such English and Scottish data was over-representation of Scottish data, and precluded having a balanced representation from both of these UK countries.

Approximately 55% of cases were male (51,016) and **45% of cases were female** (40,988).

The **median age of cases was 68 years**, (range 0-105 years; n = 92,089).

Where information was available,

54% patients were recorded as having at least one chronic condition,

69% (33,155/48,050) of **reported** being **admitted** into **ICU/HDU**.

63% (30,272/48,050) have **died**.

95% (7,868/8,270) and

90% (5,606/6,231) were **reported** with **respiratory** and **febrile presentations respectively**.

As a result of this, a total of 20,661 cases were included in the final analysis (using selected data from England and Scotland). Fifty-four percent of cases (11,157/20,661) were male and median age was 69 years. A total of 13% cases required ICU/HDU admission and 21% cases were reported to have died in hospital.

Overall, we observed two waves of the pandemic in all sites (Figure 2). In total, 16, 840 cases were included in our analysis (7,221 and 9,619 in the first and second wave, respectively). The proportion of ICU/HDU admissions dropped significantly in the second wave, in both sexes, and across all age groups except for the <15- and ≥75-year-olds. The proportion of deaths also dropped significantly, in both sexes, and in all age groups ≥45 years (Table 1).

Table 1: First and second wave of COVID-19 by hospital admissions, ICU/HDU admissions and deaths.

Category	Sub-category	First wave			Second wave			P value (Chi-squared test of proportions, 1st wave v. 2nd wave)	
		Hospital admissions (N)	ICU/HDU (n/%)	Death (n/%)	Hospital admissions (N)	ICU/HDU (n/%)	Death (n/%)	ICU/HDU admissions	Deaths
Overall	All cases	7,221	1,092 (15)	1,758 (23)	9,619	1,086 (11)	1,913 (20)	<0.00001	<0.00001
Sex	Male	3,856	741 (19)	1,044 (27)	5,070	716 (14)	1,085 (21)	<0.00001	<0.00001
	Female	3,365	777 (10)	1,071 (21)	4,549	370 (8)	828 (18)	<0.00001	<0.00001
Age group	0-14	45	<10 (-)	<10 (-)	123	<10 (-)	<10 (-)	0.022378	0.971507
	15-44	667	90 (13)	21 (3)	1,088	100 (9)	17 (2)	0.013843	0.166424
	45-64	1,850	419 (23)	186 (10)	2,806	479 (17)	214 (8)	0.000038	<0.00001
	65-74	1,348	332 (25)	297 (22)	1,740	307 (18)	336 (19)	<0.00001	0.029814
	75+	3,311	246 (7)	1,254 (38)	3,862	196 (5)	1,343 (35)	0.104719	<0.00001

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

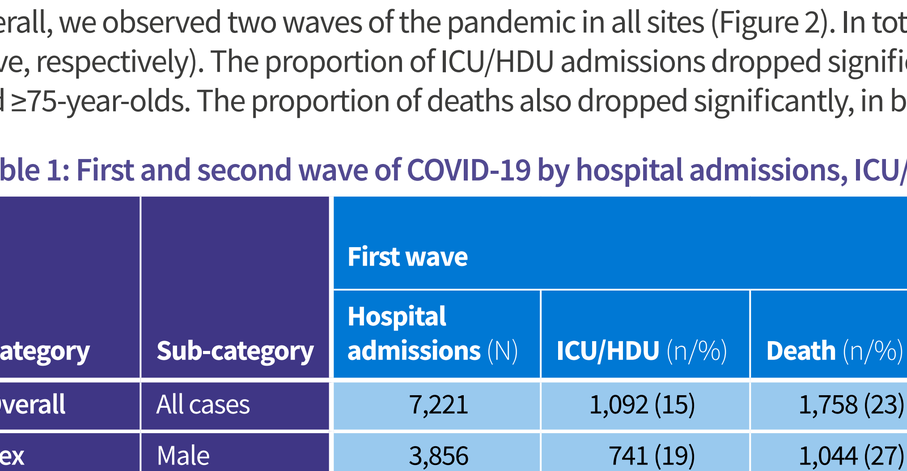
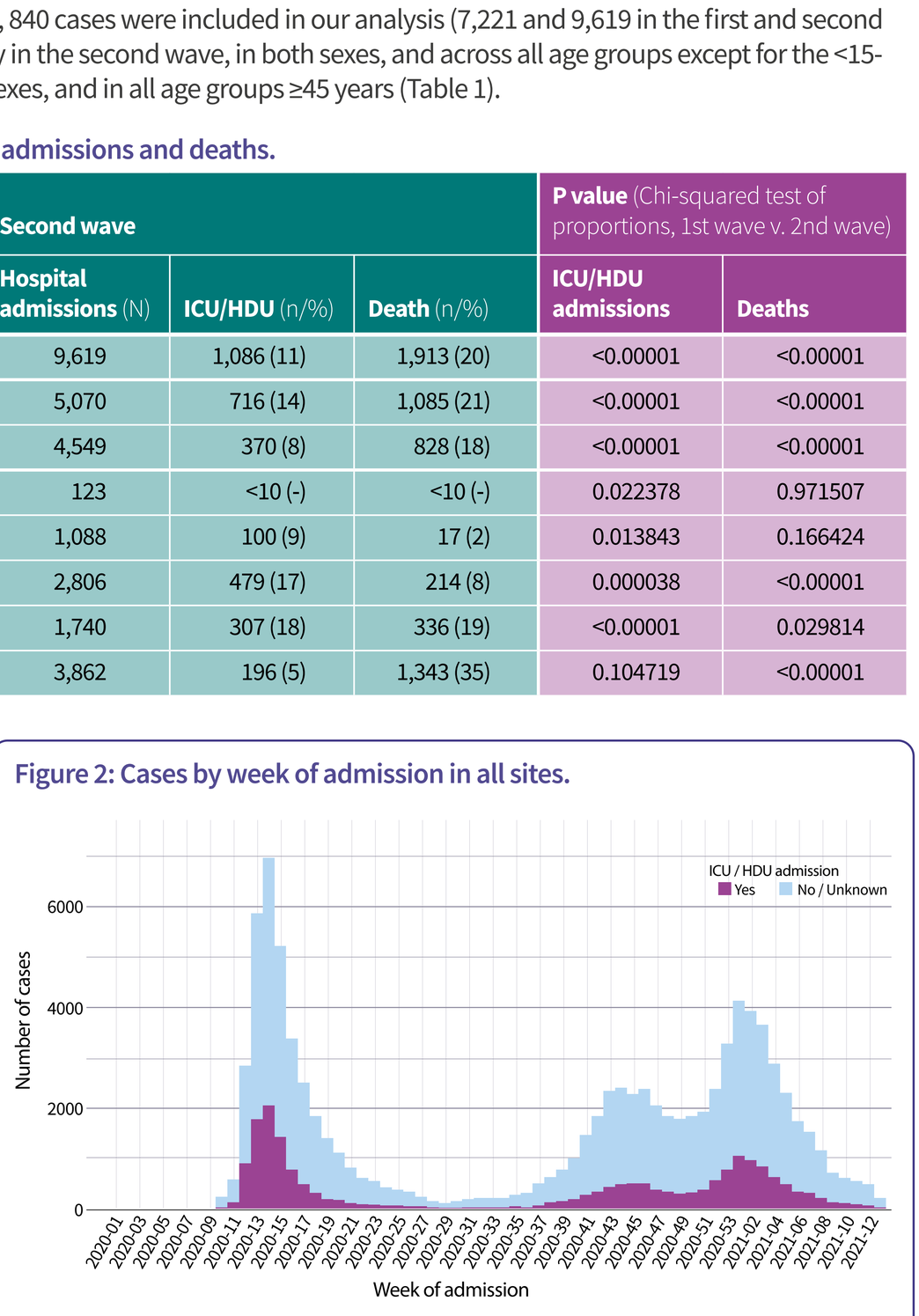


Figure 2: Cases by week of admission in all sites.



Conclusions

Results from the I-MOVE surveillance system suggest that about one in 10 hospitalised COVID-19 patients were admitted to ICU/HDU and two in 10 reported to have died. The proportion of fatality and ICU/HDU admissions significantly decreased in the second wave compared with the first as a whole and by gender and certain age groups, presumably as a result of lockdown measures, as well as the introduction of the vaccination programmes. As the vaccination programmes are expanding across age groups in many countries and across age groups, we expect to see a further decline of ICU/HDU admissions and death over time

References

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I-MOVE COVID-19