Public Health Scotland

COVID-19 UK Inquiry:

Module 3: Impact on healthcare systems

Public Health Scotland statement in response to Request for Evidence: Scottish Intensive Care Society Audit Group (SICSAG) (ref M3/Publichealthscotland)

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1 Introduction to Public Health Scotland

1.1 Purpose

1.1.1 Public Health Scotland (PHS) came into being as a corporate body on 1st April 2020, part way through the COVID-19 pandemic. PHS is responsible for improving the health and wellbeing of people in Scotland and reducing health inequalities across Scotland. This includes protecting the people of Scotland from communicable diseases and environmental hazards, working with many partners and stakeholders, including national and local government, NHS Boards, public bodies such as prison and police services, academia, and the third sector.

1.1.2 PHS shared a detailed Corporate Statement (PHS3.2/1 - INQ000401271) with the UK Public Inquiry for Module 3 in January 2023. This sets out the context in which PHS operates, PHS's joint accountability to the Scottish Government and the Convention of Scottish Local Authorities (COSLA), the general structure of PHS, its responsibilities, its governance, the arrangements for its funding, how it fits into the wider NHS structures within Scotland, the background as to how PHS came into being, and how staff were transferred across from the legacy bodies. This introduction provides a summary of the Corporate Statement.

1.2 PHS Corporate Statement

1.2.1 Health policy, services and funding are devolved, so national direction in Scotland is set by the Scottish Government, and funding for health is determined by the Scottish Government. However, because many of the determinants of health lie outwith the health sector (e.g., housing, education, income and employment, place and community), Public Health Scotland (PHS) operates in the context of wider public policy and in particular social policy aimed at reducing inequalities. The creation of PHS was an outcome of the Public Health Reform (PHR) programme (see chapter 5 of the Corporative Narrative: Creation of PHS). The PHR programme identified the need for stronger national leadership for public health and a 'de-cluttering' of the public health landscape. Recommendations around the optimal arrangements for PHS were developed and were taken forward through the development and implementation of a Target Operating Model (TOM) (PHS3.2/2 - INQ000183552).

1.2.2 The TOM described how all the parts of the new organisation would work together to:

- Provide strong collaborative public health leadership.
- Take a whole system approach with an external focus.

- Have a clear focus on supporting local systems and play a key role in enabling and supporting delivery at a local, regional and national level.
- Be intelligence, data and evidence led.
- Be innovative and find new ways of doing things.
- Be visibly a new and different organisation.

1.2.3 PHS brought together three legacy bodies (see chapter 4 of the Corporative Narrative: Legacy Bodies). These were NHS Health Scotland (a national Health Board), and the two components of the Public Health and Intelligence Strategic Business Unit of the national Health Board NHS National Services Scotland (NSS): Health Protection Scotland (HPS) and Information Services Division (ISD). The PHR programme intended for PHS to be more than the sum of its parts; to be more effective in meeting the challenges facing the people of Scotland than the legacy organisations before it.

1.2.4 All staff and functions from the legacy bodies transferred across to PHS under the Transfer of Undertakings (Protection of Employment) Regulations 2006 with two exceptions: a number of corporate services staff from NHS Health Scotland transferred to NSS under the shared services arrangement and the Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) function and staff that were part of HPS remained within NSS.

1.2.5 The decision to retain ARHAI within NSS is of particular relevance to Module 3. ARHAI forms part of NHS Assure which was developed to help health boards and regions in Scotland to comply with regulations and avoid risks in healthcare built environment projects. Prior to 1 April 2020, PHS legacy organisation HPS had a role in Infection Prevention and Control (IPC), when it encompassed ARHAI. This ceased on 1 April 2020 when ARHAI remained within NSS. Professional collaboration between PHS and ARHAI continued throughout the pandemic, which is discussed in more detail below. PHS's role in providing advice, guidance and expertise to prevent infection in healthcare settings has been limited since April 2020.

1.2.6 PHS made a significant contribution to the healthcare response in key areas including:

- The provision of data and intelligence as the provider of official statistics for NHS Scotland.
- Adapting and ensuring consistency of infection control guidance for use

between healthcare and community settings.

- The development of digital tools designed for use by NHS Boards and partners.
- Research and evidence on the impact of the pandemic on the healthcare system.
- The provision of strategic advice on managing and mitigating both the direct and indirect harms to health caused by the pandemic.

1.2.7 The Scottish Intensive Care Society Audit Group (SICSAG) are part of the Scottish National Audit Programme (SNAP) within PHS. SNAP provides an internationally recognised health intelligence service which plays a key role in promoting safe, effective and person-centred healthcare in Scotland. The Programme consists of a wide range of national clinical audits, many of which are speciality-based and involve clinical, government and voluntary sector stakeholders.

1.2.8 During the pandemic SICSAG data were used to inform on the activity and capacity within critical care in Scotland. The role of SICSAG during the pandemic is discussed in Section 2.

1.3 Purpose of this statement

1.3.1 The PHS corporate statement submitted to Module 3 of the UK Public Inquiry includes setting out how in response to the pandemic SICSAG rapidly repurposed its reporting systems (see PHS3.2/1 – INQ000401271).

1.3.2 This statement fulfils a follow-up request from the UK Public Inquiry received on 19 October 2023 seeking more information on the work of SICSAG. This includes:

- A brief overview of the functions aims and geographical remit of SICSAG.
- An overview of the process by which SICSAG obtains compiles and analyses data relating to intensive care units in Scotland.
- A summary of the work undertaken by SICSAG in response to the COVID-19 pandemic during the relevant period.
- A brief overview of how SICSAG worked with key stakeholders during the relevant period in response to the COVID-19 pandemic.
- Intensive care activity during and immediately prior to the relevant period
- Critical care capacity.

2. Scottish Intensive Care Society Audit Group

2.1 Introduction

2.1.1 The Scottish Intensive Care Society Audit Group (SICSAG) aims to improve the quality of care delivered to the most severely ill or injured patients and patients with complex needs by monitoring and comparing activities and outcomes in critical care units (specialist hospital wards). Critical care units comprise intensive care units (ICUs), high dependency units (HDUs) and units with both intensive care and high dependency beds (referred to as combined ICU/HDUs) (a fuller explanation of the categories of critical care units is set out in paragraph 2.3.2). SICSAG is overseen by a steering group, a group of engaged multidisciplinary clinicians. Members of the steering group assist with writing any reports for publication.

2.2 Audit of critical care

2.2.1 The audit of critical care by SICSAG is a co-ordinated quality improvement programme, supported by PHS, which provides data, analysis and feedback to critical care clinicians for management purposes, to raise standards and for continued improvement in patient outcomes. The audit seeks to inform healthcare professionals, the public and Scottish Government about critical care activity, interventions, and outcomes by providing the data in the form of graphs or tables. The central PHS team provide such data in a format appropriate for stakeholders. During the pandemic the central PHS team provided such data on a factual basis supporting stakeholders in their analysis and interpretation for management purposes. The audit provides ongoing quality assurance and national benchmarking for critically ill patients.

2.2.2 The SICSAG infrastructure provides a ‘bed bureau’ function that identifies the current occupancy of Intensive Care beds in Scotland. While the key target audience is the Critical Care and Emergency Medicine community, data from the audit can also be used to inform the Scottish Government Health Directorates and NHS Boards about levels of activity and resource requirements in Intensive Care.

2.2.3 WardWatcher is a bespoke database used by SICSAG to gather and analyse data (PHS3.2/3 – INQ000479141). It collects data on admissions to critical care units in Scotland in real time. The audit covers all ICUs and combined ICU/HDUs in Scotland, and over 98% coverage of general HDUs. The live bed bureau function is limited to ICUs and combined ICU/HDUs. This updates anytime a patient is admitted to or discharged from an ICU/HDU and is accessible to all ICUs in Scotland. During the pandemic this report was shared with management in PHS and Scottish Government providing the daily numbers at 9am and also the data from the previous day at 9am to allow comparison over the 24-hour period. Further monthly reports are generated for the unit staff giving insight into the numbers of patients admitted, the outcomes and levels of care needed when in the unit.

2.2.4 In March 2020 in response to the pandemic SICSAG rapidly repurposed its reporting systems, which usually operate on a monthly basis, to develop a daily flow of data from all intensive care units in Scotland. During the pandemic SICSAG transformed the systems to develop and evolve research datasets on the critical care activity and reports to inform key stakeholders such as:

- The NHS
- Scottish Government
- Scottish Critical Care Delivery Group (SCCDG) - the service advisory forum for Critical Care in Scotland, and is an association of regional delivery group Chairs
- Unit Audit Leads (clinical staff)
- PHS

2.2.5 The ICU management data was used by stakeholders to:

- help track the pandemic.
- provide accurate information to the SCCDG on critical care unit capacity.
- provide accurate information on the number of patients in ICU with COVID-19 (after linkage with laboratory testing results was established).
- Inform procurement on the requirement for equipment, drugs, and PPE.
- Capture activity in areas that were repurposed as ICUs.
- Support modelling and COVID-19 research activity.

2.3 Audit data reported

Management reports

2.3.1 To meet the needs of stakeholders, extracts of data were produced. Table 1 below sets out the reports of this data, their frequency and the information provided.

Table 1: SICSAG regular reports

Frequency and description	Recipients
Daily reporting:	
Beds report Taken by SICSAG central staff to obtain a report on the occupied beds at 9am in ICUs (PHS3.2/4 –INQ000372596). This report showed the number of beds that were full, empty or closed (due to lack of staff or equipment to staff the bed) in each hospital ICU or combined ICU/HDU at 9am. In addition it showed the number of level 3 (ventilated patients or those who need 1:1 nurse ratio), level 2 (who are not ventilated and can be looked after by one nurse to two patients), level 1 (patients requiring more monitoring than a general ward could give) and level 0 which is ward fit patients (not normally looked after in ICU but there may be no beds available to transfer them out to) (PHS3.2/5 – INQ000372597). The report also showed the previous day's data for number comparison and the number of patients who were suspected to have or had tested positive for COVID-19.	Scottish Government. PHS management. PHS modelling team (see paragraph 3.1.4). PHS procurement team (see paragraph 3.1.4). Aberdeen Extra corporeal Membrane Oxygenation (ECMO) team.[1]
Capacity report An additional daily report on capacity was added for the clinicians which included the number of beds that were empty, levels of care and additional data on capacity verses an agreed baseline of funded beds (this is the number of beds that are staffed on a 1:1 or 1:2 nurse to patient ratio basis) (PHS3.2/6 – INQ000372598).	Only shared with the critical care delivery group and unit staff.

[1] The adult Extra Corporeal Membrane Oxygenation (ECMO) Service is based within the Royal Infirmary Hospital in Aberdeen. ECMO provides temporary life support to adults with severe respiratory failure, while allowing the lungs to rest and recover from injury.

Frequency and description	Recipients
Weekly reporting	
Internal PHS and governmental report on COVID-19 Data taken by SICSAG central staff to create reports linked to COVID-19 laboratory results (PHS3.2/7 –INQ000372604). This was reported at a network level (North network included NHS Grampian, NHS Highland & Islands and NHS Tayside, East included NHS Borders, NHS Fife and NHS Lothian & West included NHS Ayrshire and Arran, NHS Dumfries and Galloway, NHS Forth Valley, NHS Greater Glasgow & Clyde, NHS Lanarkshire and National Waiting times centre). The report included data on: • the number of patients at midnight in the health board who had tested positive for COVID-19. • the numbers on levels of care the patients with COVID-19 required. • the number of patients with COVID-19 who were ventilated or receiving non- invasive ventilation. • number of patients with COVID-19who were needing intravenous cardiac drugs. • number of patients with COVID-19 who were receiving renal replacement therapy. • new admissions since the previous day.	Other teams within PHS. Scottish Government.
COVID-19 report for critical care staff Data taken by SICSAG central staff to create reports. This report contains stacked charts that gave a visual representation of the number of patients with a COVID-19 diagnosis against the non-COVID-19 admissions from the beginning of March through to the current extract date in this example 26 June 2022 (PHS3.2/8 – INQ000372602).	Critical care staff in Scotland.

Frequency and description	Recipients
Monthly reporting	
Individualised unit reports. Each unit receives a tailored report. This report was occurring on a monthly basis before (and continued through) the pandemic. It gives breakdowns of admissions, an occupancy level; how many patients were ventilated; had cardiac, renal support or an epidural; and the level of care the patient needed based on the highest level of care received e.g. ventilated. There is a list of validations to be used to correct data that may be wrong or missing e.g. post code. Reports for ICU and combined ICU/HDU units also contain a chart that summarises mortality for the most recent 300 discharges. Extracting this data monthly allows validation and update of any data in the main SICSAG database used to generate all the other reports.	Critical care staff in Scotland.

2.3.2 The organisational structure of critical care units varies by hospital and health board:

- Units that only contain level 3 beds (where patients require two or more organ support or need mechanical ventilation alone and are staffed with one nurse per patient and usually with a doctor present in the unit 24 hours of the day) are referred to as **standalone ICUs**.
- Those that contain only level 2 beds (where patients only need single organ support - excluding mechanical ventilation - such as renal replacement therapy (RRT) or inotropes and invasive BP monitoring and are staffed with one nurse to two patients) are referred to as **standalone HDUs**. (RRT is a type of life support treatment used to remove waste products and excess fluid from the body when the kidney's stop working properly. Inotropes are a type of life support treatment used to support the heart and blood pressure.)
- Those that contain a mixture of level 3 and level 2 beds in the same unit are referred to as **combined ICU/HDUs** (or combined units).

COVID-19 Reports

2.3.3 SICSAG published 13 COVID-19 reports on data available between 1 March 2020 and 13 March 2022 (PHS3.2/9 - INQ000256631) in addition to daily management reports. Over the course of the pandemic the COVID-19 reports were publicly available and used to provide information on the number of patients admitted to a critical care unit; how long they remained in the unit; the levels of care they received ranging from ventilation to basic oxygen support; and the demographics of the patients admitted - (male, female, age range, where did they live; and length of stay and outcomes of these patients). These are listed in Table 2 below. It was not the role of the PHS SICSAG team to make recommendations on the management of patients admitted with COVID-19, rather only to provide the described information.

Table 2: SICSAG COVID-19 reports

Title	Date published	Exhibit number
SICSAG: Audit of critical care in Scotland	8 August 2023	PHS3.2/10 - INQ000390572
SICSAG: Audit of critical care in Scotland	6 September 2022	PHS3.2/11 - INQ000390571
Patient Family Experience COVID-19 report	6 September 2022	PHS3.2/12 - INQ000390573
SICSAG report on COVID-19	20 April 2022	PHS3.2/13 - INQ000281050
SICSAG report on COVID-19	2 February 2022	PHS3.2/14 - INQ000390569
SICSAG report on COVID-19	13 October 2021	PHS3.2/15 - **INQ000470091**
SICSAG report on COVID-19	2 June 2021	PHS3.2/16 - INQ000390567
SICSAG report on COVID-19	31 March 2021	PHS3.2/17 - INQ000390566
SICSAG report on COVID-19	24 February 2021	PHS3.2/18 - INQ000390565
SICSAG report on COVID-19	9 December 2020	PHS3.2/19 - INQ000390564
SICSAG report on COVID-19	8 July 2020	PHS3.2/20 - INQ000390563
SICSAG report on COVID-19	3 June 2020	PHS3.2/21 - INQ000352859
SICSAG report on COVID-19	13 May 2020	PHS3.2/22 - INQ000352858

Research articles

2.3.4 The SICSAG steering group also published four research articles contributing to international knowledge relating to COVID-19 critical illness, focussing on a range of features, including social deprivation, pregnancy, persistent critical illness and the use of non-invasive respiratory support:

- February 2021: Influence of socioeconomic deprivation on interventions and outcomes for patients admitted with COVID-19 to critical care units in Scotland: A national cohort study (PHS3.2/23 - **INQ000346799**
- June 2022: Prevalence, characteristics, and longer-term outcomes of patients with persistent critical illness attributable to COVID-19 in Scotland: a national cohort study (PHS3.2/24 - INQ000346804).
- February 2023: COVID-19 infection and maternal morbidity in critical care units in Scotland: a national cohort study (PHS3.2/25 - INQ000346806).
- May 2023: Use of protracted CPAP as supportive treatment for COVID-19 pneumonitis and associated outcomes: a national cohort study (PHS3.2/26 - INQ000346805).

2.4 Summary of key messages from SICSAG data

2.4.1 A summary of the key messages covering the period of interest for the Inquiry (1 March 2020 to 28 June 2022) is listed below. Clinical management of patients in ICU continued to evolve as findings from research studies were rapidly adopted. In the said time period, the COVID-19 pandemic was defined by three waves: wave 1 is defined as 1 March 2020 to 31 July 2020, wave 2 is defined as 1 August 2020 to 17 May 2021, and wave 3 is defined as starting from 18 May 2021.

- A higher proportion of patients in wave 3 were managed with non-invasive ventilation on admission to ICU (43% in waves 1 and 2 compared with 55% in wave 3) with a corresponding reduction in the use of advanced respiratory support (45% in waves 1 and 2 vs 30% in wave 3).
- The proportion of COVID-19 patients receiving renal replacement therapy (dialysis-type treatments) reduced from 28.1% in wave 1 to 15.8% in wave 2 and further reduced to 12.5% in wave 3.
- Unvaccinated people were around six times more likely to be admitted to ICUs with a positive COVID-19 test than people who had received both doses of the COVID-19 vaccine. During wave 3,192 patients were admitted with

laboratory confirmed COVID-19 to ICUs more than 14 days after receiving the second dose of a vaccine, equivalent to 0.4 ICU admissions per week per 100,000 adult population who had received two vaccine doses. In the unvaccinated population, there were 2.2 ICU admissions per week per 100,000 adult population PHS3.2/15 - INQ000470091

- Of those admitted to ICU/combined units, 25% were from the most deprived SIMD quintile and there is a decrease in representation from each SIMD quintile as deprivation decreases, with only 13% of patients being from the least deprived SIMD quintile.[2] Patients from areas with greater socioeconomic deprivation had higher rates of admission to critical care and 30-day mortality (PHS3.2/23 - INQ000346799) and that intensive care units in disadvantaged areas were more likely to be over-capacity. The February 2021 national cohort study (see paragraph 2.3.4) highlighted the need for extra support to be given to critical care units in poorer areas, and for more to be done to tackle health inequalities.

2.4.2 SICSAG did not assess which characteristics put patients statistically most at risk of dying with COVID-19 in ICU in any of its reports. However, work undertaken by academics using SICSAG data demonstrated that those living in the most deprived areas of Scotland who were admitted to critical care units in Scotland from 1 March 2020 to 20 June 2020 had a higher frequency of critical care admission and a higher adjusted 30-day mortality (PHS3.2/23 - INQ000346799).

[2] The Scottish Index of Multiple Deprivation (SIMD) provides a relative ranking of the data zones in Scotland from 1 (most deprived) to 6,976 (least deprived) based on a weighted combination of data for seven domains: income, employment, health, education, skills and training, geographic access to services, crime and housing. The dataset includes ranks for each domain, as well as quantile bands for the overall and domain ranks (5%, 10% and 20%). Each data zone is assigned to deciles and quintiles, with band 1 containing the most deprived data zones. For instance, SIMD quintile 1 contains the most deprived 20% of data zones and quintile 5 contains the least deprived 20% of data zones.

3. Engaging key stakeholders during the pandemic

3.1 Introduction

3.1.1 The key stakeholders who received data from SICSAG are set out in paragraph 2.2.4 and what they received is in paragraph 2.3.1. This section provides further information on engagement with such key stakeholders.

3.2 Engagement

National Incident Management Team

3.2.1 SICSAG data was included in a weekly situation report provided by PHS to the National Incident Management Team (NIMT) (the NIMT provided strategic public health leadership and advice to Scottish Government Ministers on measures to control the pandemic, and consisted of local Health Board Directors of Public Health, Scottish Government policy and analytical advisors, the Chief Medical Officer, and representatives from local government and PHS teams) (PHS3.2/30 - INQ000341247).

Scottish Government

3.2.2 SICSAG data was included in daily reporting to the Scottish Government to be used to inform daily First Minister public briefings. No data was shared directly with the Chief Medical Officer or Chief Nursing Officer of Scotland.

NHS National Services Scotland (NSS)

3.2.3 PHS worked closely with NSS on data and IT infrastructure, in particular in the use of the Corporate Data Warehouse, managed by NSS, where many of the data sets managed and analysed by PHS are stored. SICSAG developed linkages through the corporate data warehouse to enable identification of the COVID status of patients who were admitted to ICU. These reports were issued on a daily basis to the PHS COVID team, NSS procurement team and PHS modelling teams. In addition to informing PHS management, the data were used by the PHS COVID-19 data team to inform the public through the publicly available PHS COVID-19 dashboard.

Other bodies

3.2.4 While no data was shared directly with UK government or UK NHS, weekly data was provided to other agencies including UKHSA and WHO.

3.2.5 COVID-19 research requests were dealt with by the Electronic Data Research and Innovation Service (eDRIS) team within PHS (the eDRIS team work with the research community to enable safe, secure and appropriate access to NHS Scotland data).

ICNARC

3.2.6 The Intensive Care National Audit and Research Centre (ICNARC) manage critical care audits in England, Wales and Northern Ireland. While there is a close working relationship between SICSAG and ICNARC, no SICSAG data was shared routinely.

4. Data: Admissions to ICU

4.1 Introduction

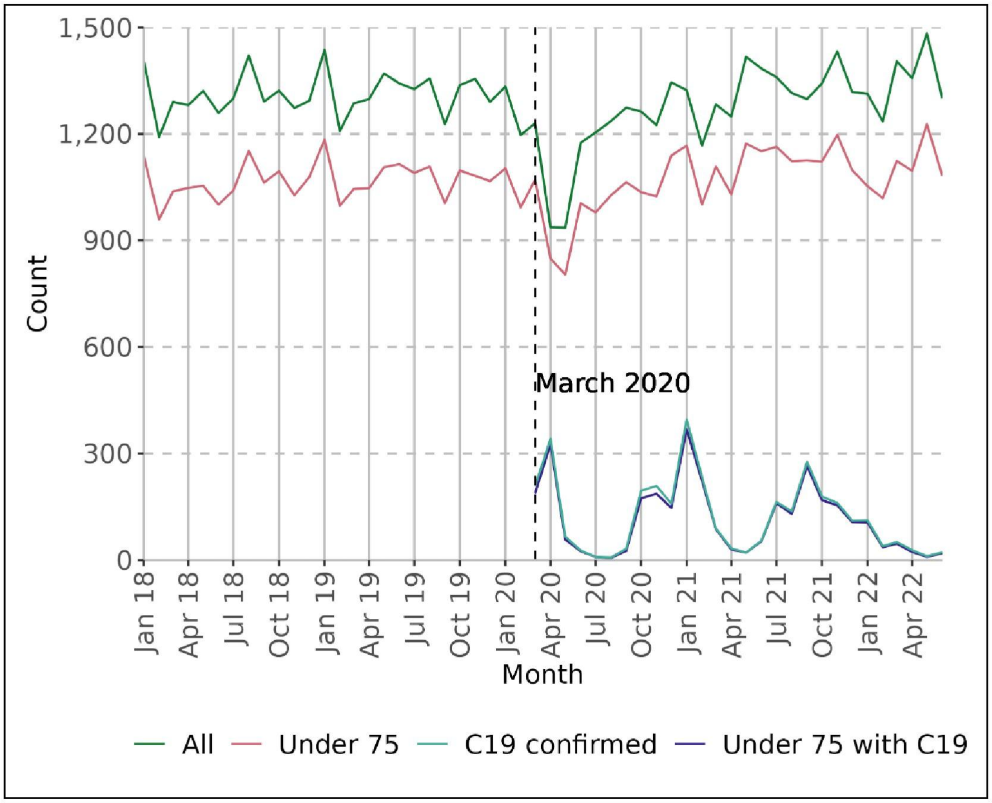
4.1.1 Data represented in this section will cover the number of admissions to ICUs in Scotland between March 2020 and June 2022. The data covers all patients admitted to an ICU or combined ICU/HDU unit with any medical condition, patients treated for a confirmed COVID-19 infection, those patients who were pregnant or recently pregnant and treated for a confirmed COVID-19 infection. Finally, patients who were admitted with either an acute myocardial infection, pregnancy related disorder not related to covid or colorectal cancer.

4.2 Data

Admissions pre-pandemic

4.2.1 Figure 1 sets out total admissions into ICU/combined units and including specific reference to under-75s. It shows that total ICU admission numbers stayed fairly steady throughout 2018 and 2019. There was a significant drop in admissions from March 2020 at the start of the COVID-19 pandemic, at which time there was a significant increase in the number of under 75 admissions. Moreover, the admission trend for patients under 75 follows very closely the peaks and troughs of positive case numbers during the COVID-19 pandemic. Total admission numbers eventually reached pre-pandemic levels towards the end of 2020 and have remained steady since then.

Figure 1: Total admissions into ICU/combined units between 01 January 2018 and 28 June 2022

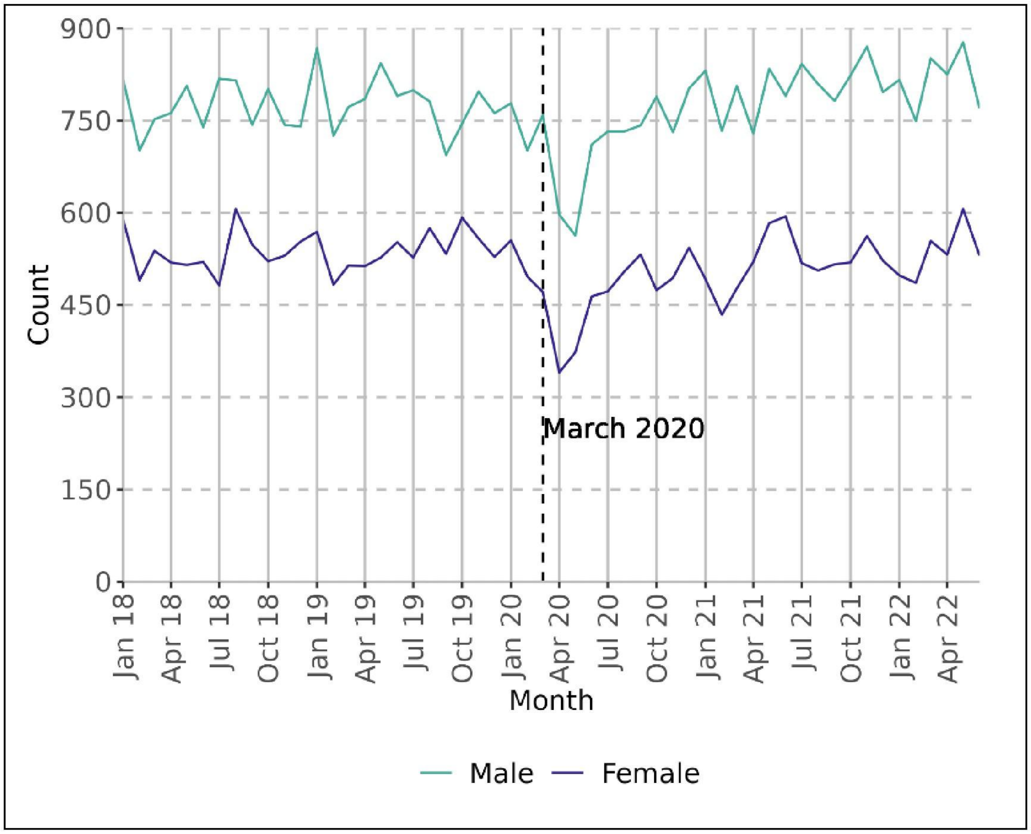


Source: Data extracted from WardWatcher database.

Demographics 2018-2022

4.2.2 Figure 2 details how ICU admissions for male patients has remained higher than that for female patients throughout the period from January 2018 to June 2022.

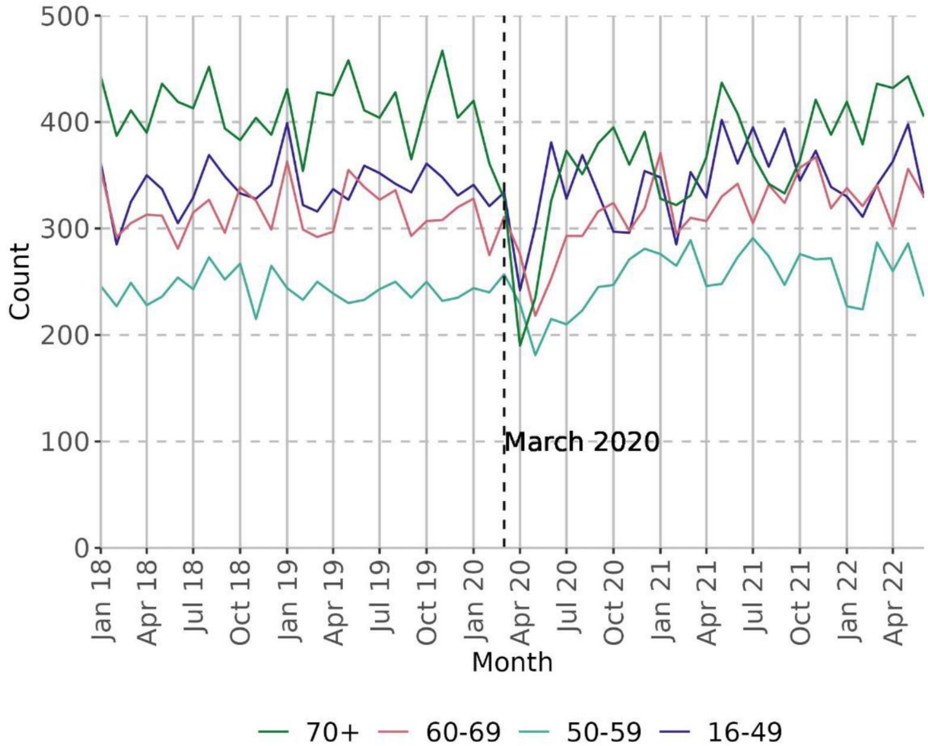
Figure 2: Admissions by sex to ICU/combined units between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

4.2.3 Figure 3 shows how ICU admissions were generally highest for those in the 70+ age category pre-COVID-19 pandemic. Admissions for all age groups dropped significantly in March 2020 at the beginning of the pandemic and 70+ was briefly the age group with the lowest number of admissions. At this time 16-49 became the age category with the highest proportion of admissions. This returned to normal by October 2020 and remained fairly consistent since then.

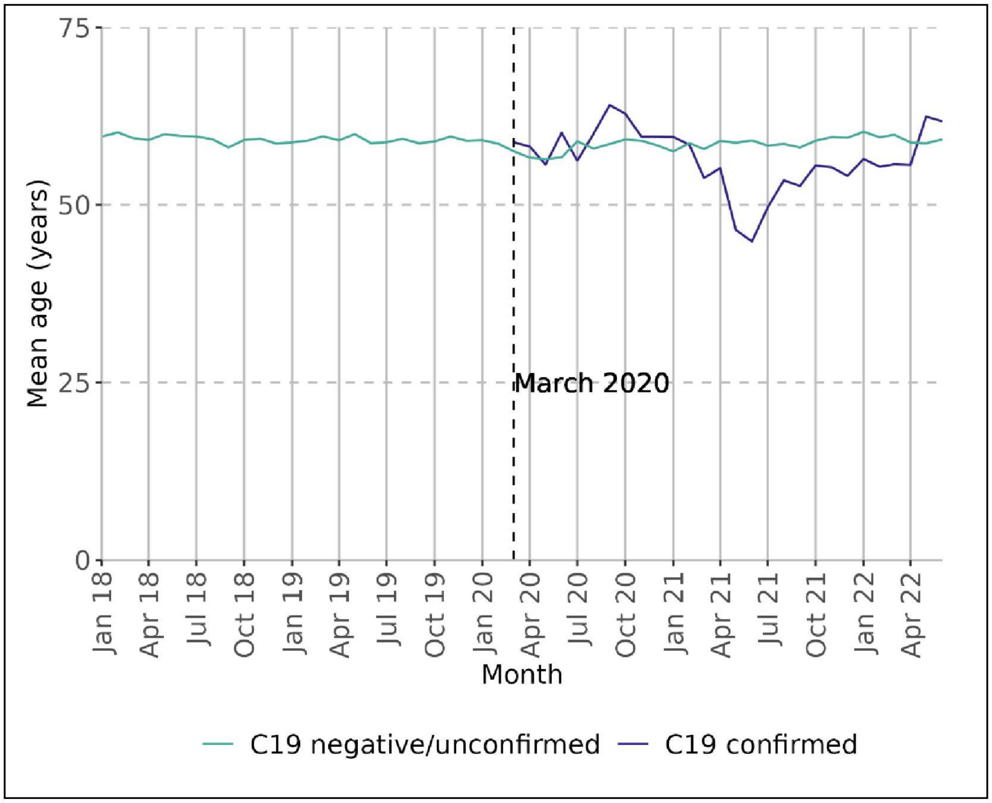
Figure 3: Admissions by age group to ICU/combined units between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

4.2.4 Figure 4 shows that non-COVID patients had a mean age of around 59 upon admission which remained consistent month-on-month both before and during the pandemic. Patients with confirmed COVID-19 had a mean age across the whole pandemic of around 57, though the month-on-month trend was less consistent with some months exceeding 60 and others reporting below 50.

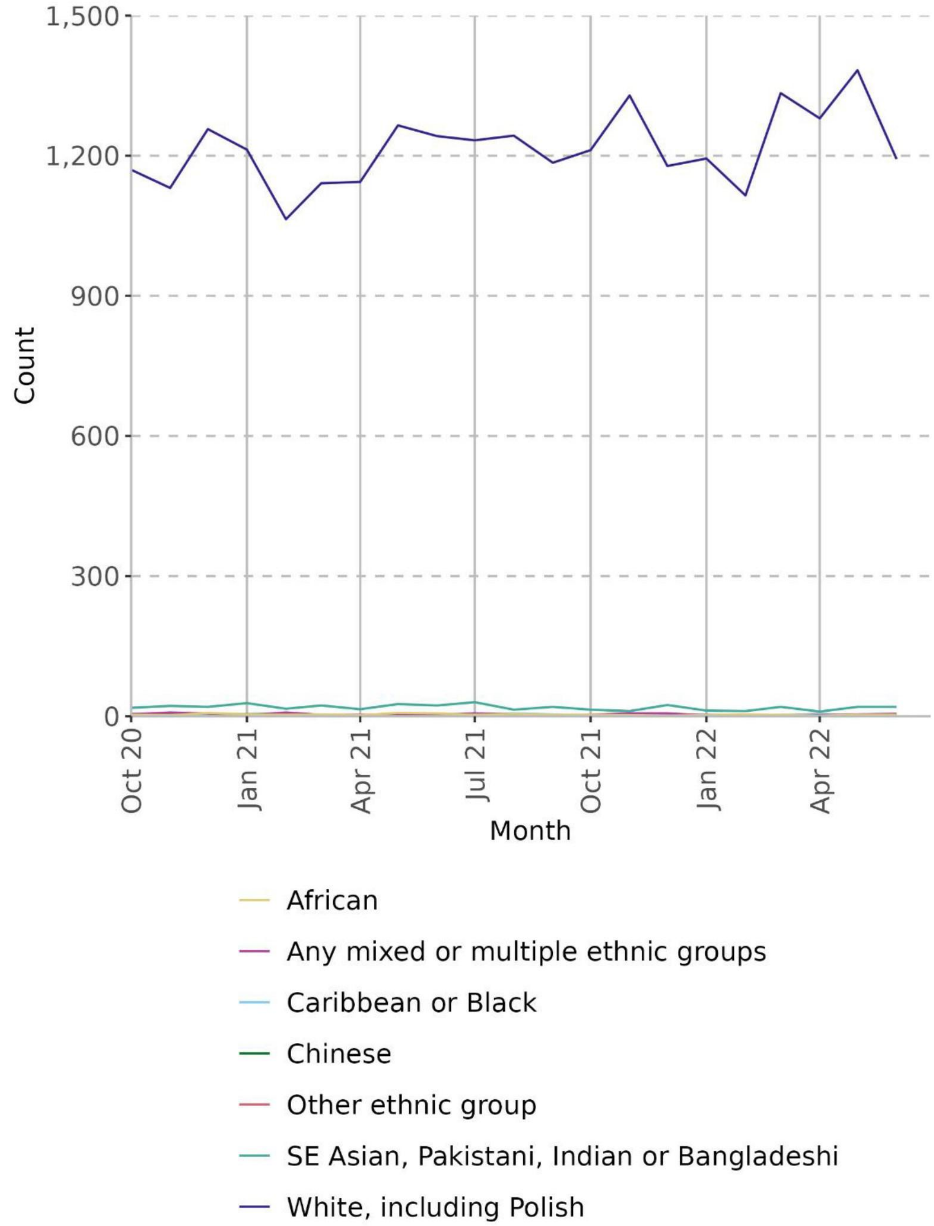
Figure 4: Mean age of patients in ICU/combined units with and without confirmed diagnosis of COVID-19 between 1 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

4.2.5 Figure 5 shows that ICU admissions are highest for those in the white ethnic group compared to other ethnic groups. It should be noted that improvements to ethnicity data collection were implemented during the autumn of 2020. An upgrade was done in all health boards on a phased basis between August and October to enable collection of data fields relevant to the pandemic such as ethnicity, body mass index (BMI) and covid diagnosis. The change to the database to allow collection of this data was to enable comparison between different ethnic groups on severity of illness, length of stay and outcomes as findings from other countries indicated that those from ethnic minority backgrounds or those with higher BMI were more at risk of a longer stay in ICU and had poorer outcomes. However, the Scottish population being predominantly white meant that the sample size within other ethnic groups was not sufficiently large to make comparisons which were statistically significant.

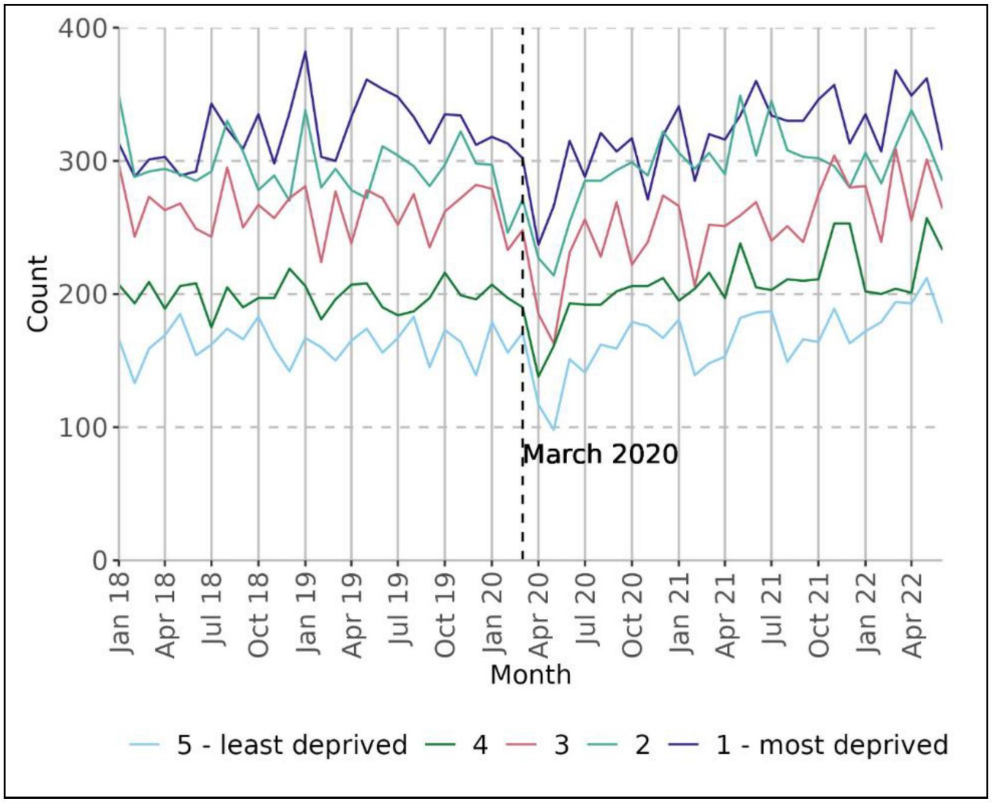
Figure 5: Admissions by ethnicity to ICU/combined units between 1 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

4.2.6 Figure 6 shows that ICU admissions were higher for those living in the most deprived areas and lowest for those living in the least deprived areas. This was true before COVID-19 and remained true throughout the pandemic.

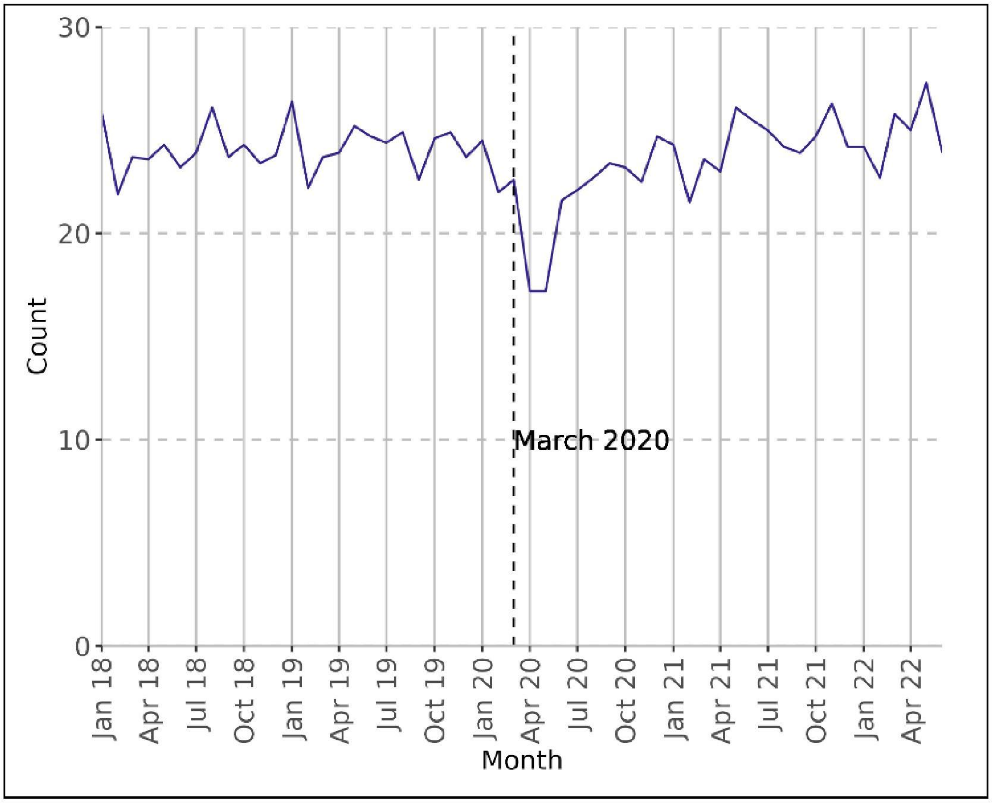
Figure 6: Admissions by index of multiple deprivation to ICU/combined units between 1 January 2018 and 30 June 2022



Source: Data extracted from WardWatcher database. Deprivation captured from Scottish Index of Multiple Deprivation (SIMD 2020v2) data zone lookup (PHS3.2/31 - INQ000469427).

4.2.7 Figure 7 shows that admissions to ICU were steady pre-pandemic. Numbers dropped in March 2020 at the beginning of the COVID-19 pandemic but returned to normal levels around the end of 2020.

Figure 7: Number of admissions to ICU/combined units per 100,000 Scottish population between 1 January 2018 and 30 June 2022



Source: Data extracted from WardWatcher database.

Selected morbidities

4.2.8 Table 3 shows the total ICU/combined units admissions and selected morbidities highlighted by the Inquiry between March 2020 and June 2022 in Scotland.

Table 3: Total ICU admissions/Combined units and morbidities (1 March 2020 to 28 June 2022)

Category	Count	Percentage of total
Total ICU admissions	35,807	100%
Admissions with primary diagnosis of COVID-19	3,373	9.4%
Pregnant or recently pregnant patients with a primary diagnosis of COVID-19 (included in previous line)	77	0.2%
Admissions with primary diagnosis of myocardial infarction	380	1.1%
Admissions with primary diagnosis of a pregnancy related disorder	84	0.2%

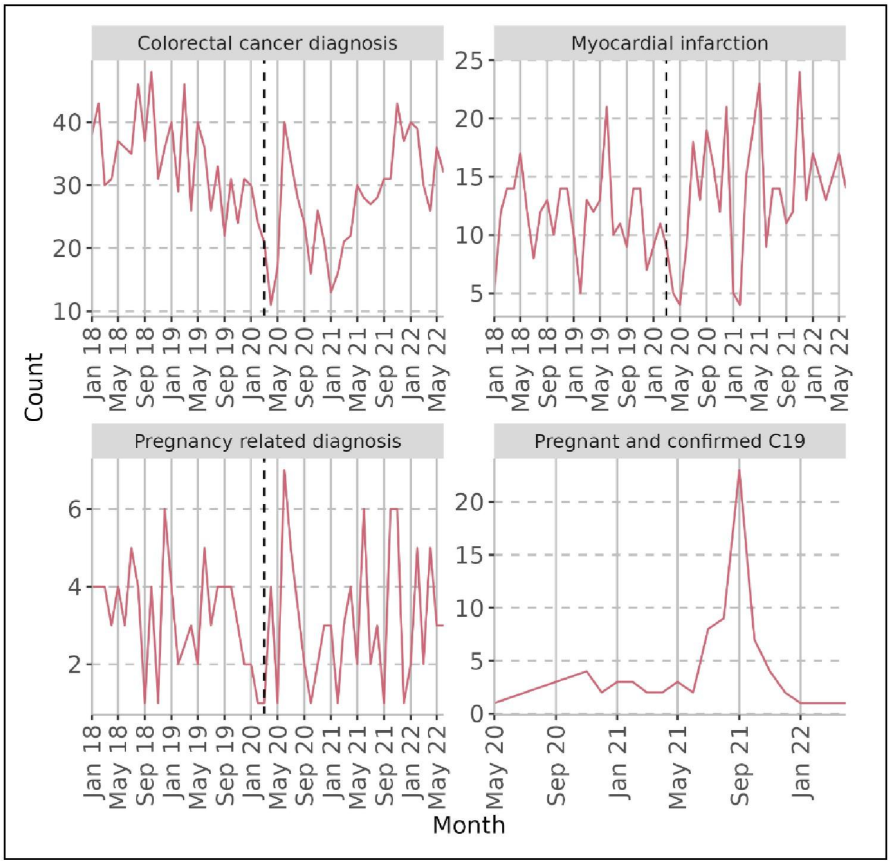
Category	Count	Percentage of total
Admissions with primary diagnosis of colorectal cancer	768	2.1%

Source: Data extracted from WardWatcher database.

4.2.9 The admissions in ICU between 1 March 2020 and 28 June 2020 was 35,807 which relates to 31,632 patients. 3,373 (9%) admissions had a positive PCR test for SARS-CoV-2. There were 77 admissions relating to patients who were pregnant or had been recently pregnant in the previous six weeks, 380 admissions relating to patients admitted with a myocardial infarction and 768 admissions relating to patients admitted with a colorectal cancer diagnosis.

4.2.10 Figure 8 shows ICU admissions against these morbidities. It shows that ICU admissions with primary diagnosis relating to colorectal cancer were highest, followed by myocardial infarction and then pregnancy related diagnoses. Pregnant women with confirmed COVID-19 generally had lower admission numbers than people with these diagnoses with the exception of September 2021 where they rose to have more admissions than myocardial infarction.

Figure 8: Number of admissions to ICU/combined units broken down by condition for each four month period between 01 January 2018 and 28 June 2022

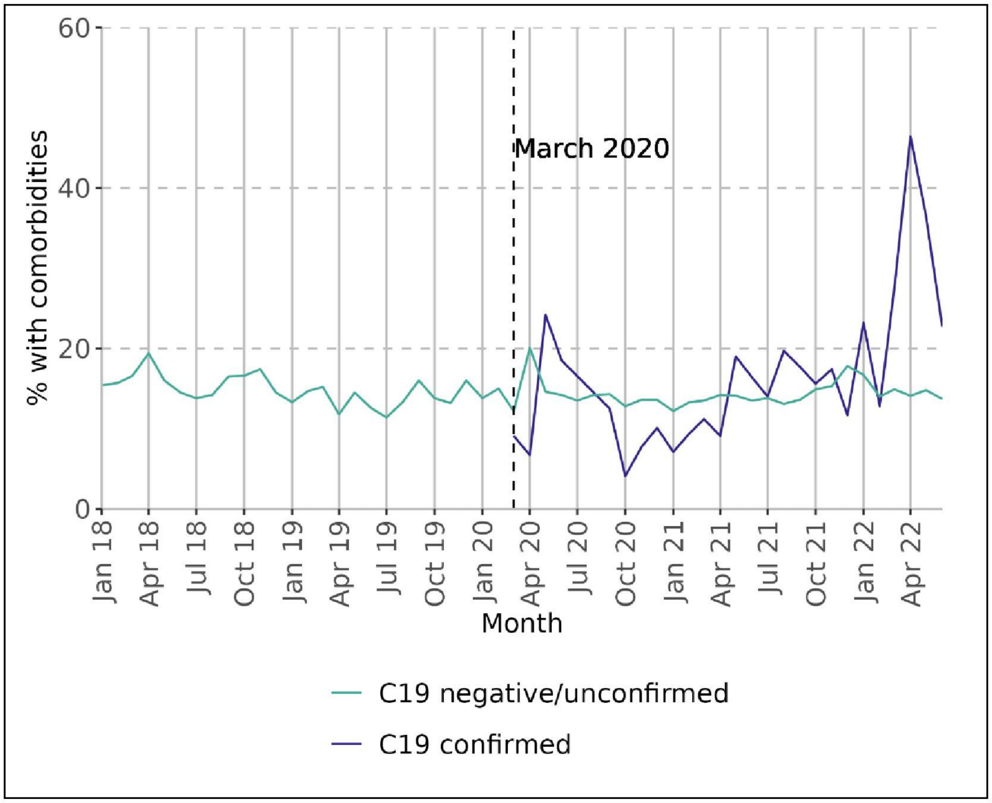


Source: Data extracted from WardWatcher database.

Comorbidities

4.2.11 Figure 9 shows that typically, around 15% of non-COVID patients are identified as having at least one comorbidity. This was true both before and during the pandemic. For COVID-19 admissions the proportion recorded with at least one comorbidity was not so consistent—with the peak at 46% in April 2022.

Figure 9: Prevalence of comorbidities in COVID and non-COVID patients between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

Admission demographics: March 2020 to June 2022

4.2.12 The characteristics of the all patients admitted to ICU in Scotland between March 2020 and June 2022 in Scotland and those admitted who had a positive PCR test for SARS-CoV-2 patient groups – including two age groups as requested by the Inquiry - are detailed in tables 4 and 5 respectively.

Table 4: Total ICU/combined units demographics for all patients (all demographics are for 01 March 2020 to 28 June 2022 period unless stated otherwise)

Demographic	Category	Numeric
Age	Mean (all)	58.5
	Median (all)	61
	Mean (non-COVID patients)	58.9
	Median (non-COVID patients)	62
	Mean (01 January 2018 to 29 February 2020)	59.2

Demographic	Category	Numeric
	Median (01 January 2018 to 29 February 2020)	62
Age group 1	16-49	9,590
	50-59	7,107
	60-69	8,857
	70+	10,253
Age group 2	16-29	2,301
	30-39	2,993
	40-49	4,296
	50-80	23,892
	80+	2,325
Sex	Female	14,116
	Male	21,691
Ethnicity	African	80
	Any mixed or multiple ethnic groups	100
	Caribbean or Black	59
	Chinese	52
	Other ethnic group	64
	SE Asian, Pakistani, Indian or Bangladeshi	478
	White	30,590
	Refused/not provided by patient	1,650
	Unknown	2,734
Body mass index (BMI)	Underweight (<18.5)	812
	Normal range (>=18.5 and <25)	6,604
	Overweight (>=25 and <30)	6,974
	Obese (>=30)	7,709
	BMI unavailable	13,708
Presence of comorbidities	Comorbidities present	5,043
	No comorbidities	30,764
APACHE II score (please see paragraph 4.2.15 for definition)	APACHE score 0-9	12,845
	APACHE score 10-24	19,677
	APACHE score 25 or over	3,285
	East network	9,672
	North network	5,628

Demographic	Category	Numeric
Geographical network of admission	West network	20,507
Scottish Index of Multiple Deprivation	1 - most deprived	8,938
	2	8,260
	3	7,056
	4	5,785
	5 - least deprived	4,656
	Unknown	1,112

Source: Data extracted from WardWatcher database Deprivation captured from Scottish Index of Multiple Deprivation (SIMD 2020v2) data zone lookup.

Table 5: ICU demographics for confirmed COVID-19 patients (1 March 2020 to 28 June 2022)

Demographic	Category	Numeric
Age	Mean age	56.8
	Median age	59
Age group 1	16-49	872
	50-59	909
	60-69	1,019
	70+	573
Age group 2	16-29	126
	30-39	307
	40-49	439
	50-80	2,438
	80+	63
Sex	Female	1,172
	Male	2,201
Ethnicity	African	26
	Any mixed or multiple ethnic groups	15
	Caribbean or Black	18
	Chinese	9
	Other ethnic group	15
	SE Asian, Pakistani, Indian or Bangladeshi	154
	White	2,936
	Refused/not provided by patient	10
	Unknown	190
	Underweight (<18.5)	16

Demographic	Category	Numeric
Body mass index	Normal range (>=18.5 and <25)	339
	Overweight (>=25 and <30)	577
	Obese (>=30)	1,219
	BMI unavailable	1,222
Presence of comorbidities	Comorbidities present	418
	No comorbidities	2,955
APACHE II score	APACHE score 0-9	774
	APACHE score 10-24	2,350
	APACHE score 25 or over	249
Geographical network of admission	East network	727
	North network	678
	West network	1,968
Scottish Index of Multiple Deprivation	1 - most deprived	954
	2	824
	3	618
	4	533
	5 - least deprived	404
	Unknown	40

Source: Data extracted from WardWatcher database. Deprivation captured from Scottish Index of Multiple Deprivation (SIMD 2020v2) data zone lookup.

4.2.13 The mean age of those admitted to ICU overall was 58.5 years. This was very similar for those admitted who were COVID-19 positive (56.8 years). Both groups of patients had a high proportion of males (62% and 65%) and almost half of the cohort were living in the two most deprived quintiles of area based social deprivation. The majority of patients were white (85% and 87%).

4.2.14 The overall proportion of patients with a recorded severe comorbidity in WardWatcher was 14%. The past medical history used for this calculation was any patient who had:

- very severe cardiocascular disease (type of patients who cannot dress or do simple housework tasks without getting chest pain)
- severe respiratory disease (type of patients who get very short of breath putting their clothes on or doing simple household tasks)
- biopsy proven cirrhosis (patients who have had a liver biopsy to diagnose cirrhosis of the liver)

- imaging proven cirrhosis (patients who have had their liver cirrhosis diagnosed using scans)
- portal hypertension (this is one of the most serious complications of advanced liver disease)
- hepatic encephalopathy (toxins build in the blood and affect your brain because the liver is not filtering the toxins the way it should and causes confusion or disorientation)
- acute leukaemia (this is a type of cancer of the blood and bone marrow)
- chronic leukaemia (similar to acute leukaemia but progresses more slowly)
- metastatic disease (patients who have cancer that has spread to other areas of the body)
- lymphoma (this is a type of cancer that starts in the lymphatic system)
- AIDS (human immunodeficiency virus is a virus that attacks the body's immune system)
- immunosuppression (patients that have been treated or are being treated prior to their admission with something that suppress the immune system e.g. chemotherapy, radiotherapy, high dose steroids or long-term steroids) and chronic renal replacement therapy (patients who require dialysis to assist with their kidney function).

4.2.15 These rates were similar in those with a COVID-19 diagnosis (12%). Of those with a BMI measurement recorded, a higher percentage of patients admitted with COVID-19 had a BMI in the range of slightly obese to morbidly obese (30-≥40): 36% versus 22% in the overall ICU admissions. Severity of acute illness, measured by APACHE II score (a predictor risk of mortality on an increasing scale from 0-71) revealed that patients who were admitted with COVID-19 had a higher severity of illness compared with ICU admissions. The distribution of regional admissions was similar in the total ICU admissions and the COVID-19 admissions with the majority being admitted in the West of Scotland (57% of total admissions and 58% of COVID-19 admissions). East of Scotland saw 27% of all admissions and 22% of COVID-19 admissions, and the North of Scotland saw 16% of all admissions and 20% of COVID-19 admissions. The ICU admissions rates for East of Scotland, North of Scotland and West of Scotland were 670, 433 and 761 per 100,000 respectively. The respective ICU admission rates for COVID-19 patients were 50, 52 and 73 per 100,000.

5. Data: Admissions and deaths

5.1 Introduction

5.1.1 This section will cover data on the total number of deaths in ICUs in Scotland between March 2020 and June 2022 broken down by:

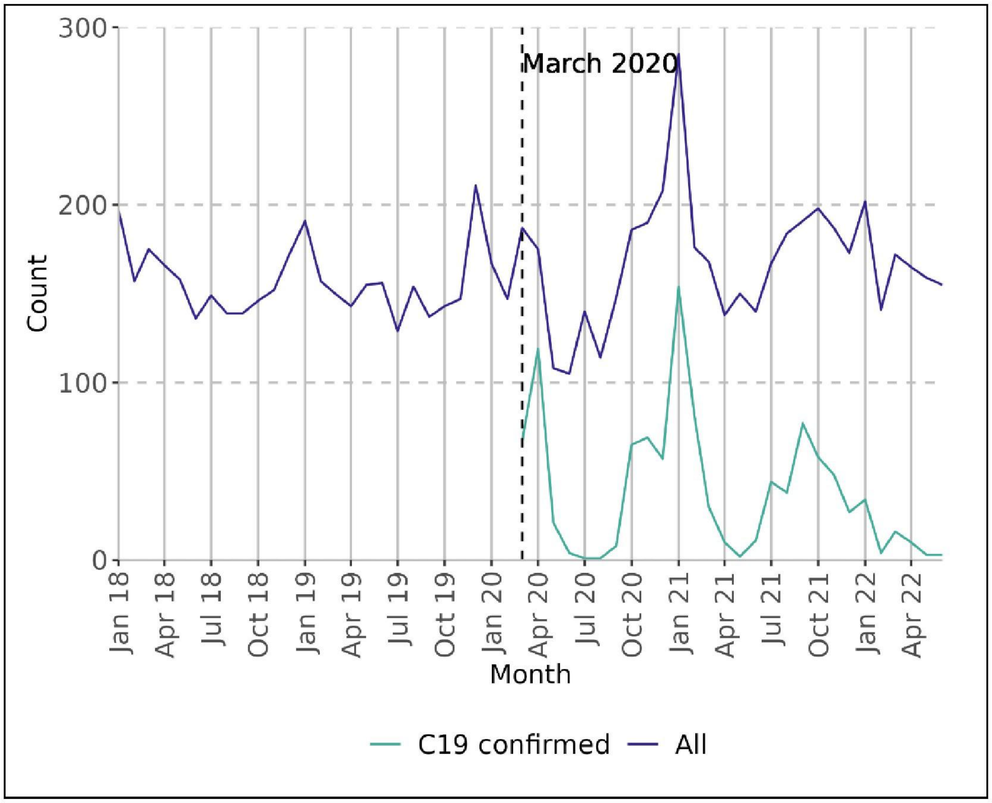
a) all patients with any health condition.
b) patients treated for a confirmed COVID-19 infection.
c) pregnant or recently pregnant women being treated for a confirmed COVID-19 infection.
d) patients admitted with a primary diagnosis of each of the following conditions:
   - acute myocardial infarction.
   - pregnancy-related disorders other than a COVID-19 infection; and
   - colorectal cancer, including post-operative patients.

5.2 Data

Total deaths

5.2.1 Figure 10 shows that pre-pandemic deaths for all patients within ICU/combined units were steady from 2018. There was a drop in total deaths in March 2020 at the start of the COVID-19 pandemic. There was a spike in total number of deaths in the 2020/2021 winter period, though this returned to pre-pandemic numbers by mid-2021.

Figure 10: Total number of deaths for all patients and COVID-19 patients within ICU/combined between 1 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

Total deaths and morbidities

5.2.2 The total ICU deaths and selected morbidities highlighted by the Inquiry between March 2020 and June 2022 are shown in table 5.

Table 5: Total ICU deaths and morbidities (1 March 2020 to 28 June 2022)

Category	Count	Percentage of total deaths
Total ICU deaths	4,712	100%
Primary diagnosis of COVID-19	1,062	22.5%
Pregnant or recently pregnant patients with a primary diagnosis of COVID-19	1	<0.1%
Primary diagnosis of myocardial infarction	44	0.9%
Primary diagnosis of a pregnancy related disorder	2	<0.1%
Primary diagnosis of colorectal cancer	20	0.4%

Source: Data extracted from WardWatcher database.

5.2.3 The total number of deaths between 1 March 2020 and 28 June 2022 was 4,712

(13% of all ICU admissions). 23% of these deaths were patients with a positive PCR test for SARS-CoV-2 (this amounts to 31% of all COVID-19 admissions). Three patients who were pregnant or recently pregnant died during that period with only one having a positive diagnosis of COVID-19 and fitting the SICSAG definition of COVID-19 positive (any patient admitted to ICU with a valid linkage to laboratory data and with laboratory confirmation of COVID-19 during the 21 days before the date of ICU admission OR with laboratory confirmation for COVID-19 during their ICU stay, from the date of ICU admission up to and including the date of ICU discharge.) There were 44 deaths and 20 deaths in patients with primary diagnosis of myocardial infarction and colorectal cancer respectively.

5.2.4 Table 6 shows rates in the four years leading to the pandemic, with variability in the number of deaths by diagnosis in the years presented.

Table 6: Total number of deaths within ICU between 1 January 2018 and 28 June 2022 for patients with primary diagnosis of colorectal cancer, myocardial infarction, or pregnancy related conditions.

Diagnosis	Year	Count
Myocardial infarction	2018	27
	2019	12
	2020	19
	2021	16
	2022 (up to 28 June)	11
Colorectal cancer	2018	15
	2019	4
	2020	6
	2021	10
	2022 (up to 28 June)	6
Pregnancy related condition	2018	0
	2019	0
	2021	1
	2022 (up to 28 June)	1

Source: Data extracted from WardWatcher database.

5.2.5 It is not possible to provide analysis of COVID-19 diagnosis against specific treatments as SICSAG do not collect data in this regard.

Total deaths and other selected characteristics

5.2.6 The characteristics of the patients who died in ICU and those who died in ICU after admission with a positive PCR test for SARS-CoV-2 are detailed in table 7.

Table 7: Characteristics of deaths in ICU/Combined between 1 March 2020 and 28 June 2022

Demographic	Category	Numeric: all deaths	Numeric: Confirmed COVID-19
Age	Mean age	61.5	62.2
	Median age	64	63
Age group 1	16-49	864	126
	50-59	960	252
	60-69	1,380	411
	70+	1,508	273
Age group 2	16-29	148	5
	30-39	218	28
	40-49	498	93
	50-80	3,523	910
	80+	325	26
Sex	Female	1,751	309
	Male	2,961	753
Ethnicity	African	10	7
	Any mixed or multiple ethnic groups	12	4
	Caribbean or Black	8	5
	Chinese	11	6
	Other ethnic group	10	2
	SE Asian, Pakistani, Indian or Bangladeshi	99	47
	White	4,269	945
	Refused/not provided by patient	26	1
	Unknown	267	45
Body mass index	Underweight (<18.5)	103	3
	Normal range (>=18.5 and <25)	835	106
	Overweight (>=25 and <30)	815	176
	Obese (>=30)	1,062	392
	BMI unavailable	1,897	385
Presence of comorbidities	Comorbidities present	1,089	192
	No comorbidities	3,623	870
APACHE II score	APACHE score 0-9	894	135
	APACHE score 10-24	2,266	786

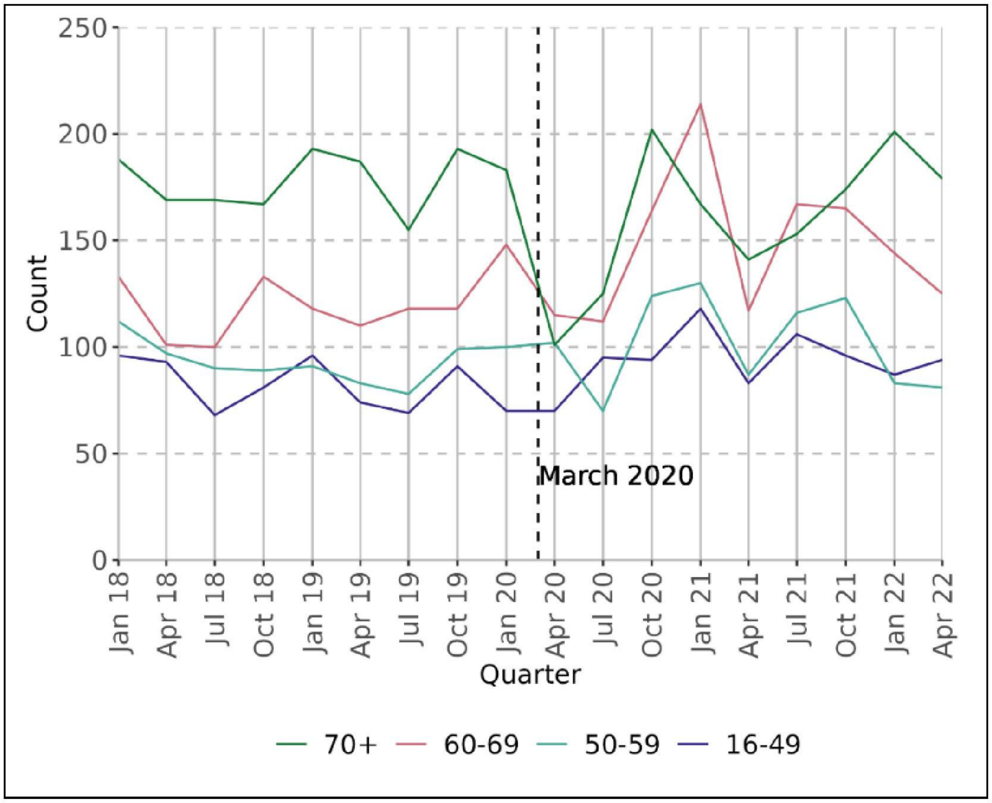
Demographic	Category	Numeric: all deaths	Numeric: Confirmed COVID-19
	APACHE score 25 or over	1,552	141
Geographical network of admission	East network	997	166
	North network	1,015	220
	West network	2,700	676
Scottish Index of Multiple Deprivation	1 - most deprived	1,222	297
	2	1,124	252
	3	909	196
	4	715	172
	5 - least deprived	599	134
	Unknown	143	11

Source: Data extracted from WardWatcher database. Deprivation captured from Scottish Index of Multiple Deprivation (SIMD 2020v2) data zone lookup.

5.2.7 The mean age of those who died was 61.5 years. This was similar for those admitted who were COVID-19 positive (62.2 years). Both groups of patients had a higher proportion of males (63% and 71%), half of the cohort were living in the two most deprived quintiles of area based social deprivation. The majority of patients were white (91% and 89%). The overall proportion of patients with a recorded severe comorbidity in WardWatcher was 23%. This was slightly lower in those with a COVID-19 diagnosis (18%). Of the recorded BMI in WardWatcher, more patients with a BMI in the obese range (30-≥40) died if admitted with COVID-19 (37%) than in the total admissions to ICU who died (23%). In the total ICU cohort almost half of the patients that died (48%) had an APACHE II score of 10-24, which was much higher in the COVID-19 deaths at 74%. Of the admissions in the North 18% died, increasing to 34% in those admitted with COVID-19. There was a similar increase in the East:10% rising to 23% for those admitted with COVID-19; and in the West: 13% rising to 34% for those admitted with COVID-19.

5.2.8 Figure 11 shows that total number of deaths is generally highest for those in the 70+ age category. In the 2020/2021 winter deaths spike, the 60-69 category briefly took over with the highest number of deaths. This returned to normal by mid-2021.

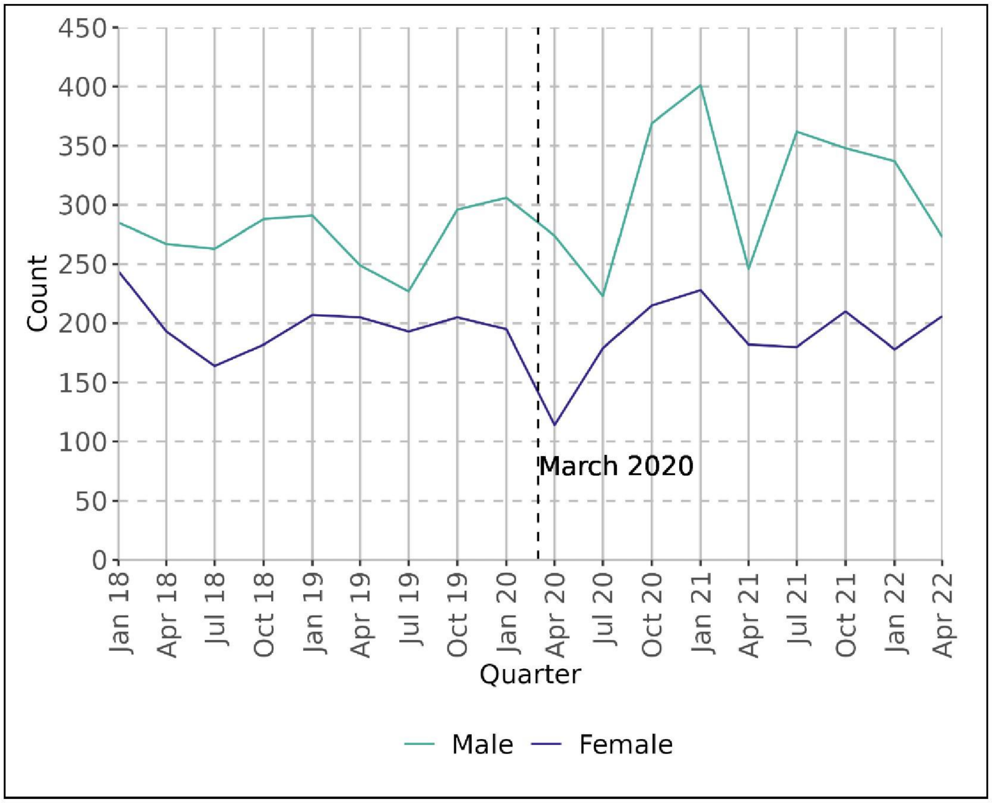
Figure 11: Total number of deaths by age group within ICU/combined between 1 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

5.2.9 Figure 12 shows that the total number of deaths is higher for male patients than female patients. There are more male patients than female patients in ICUs in Scotland.

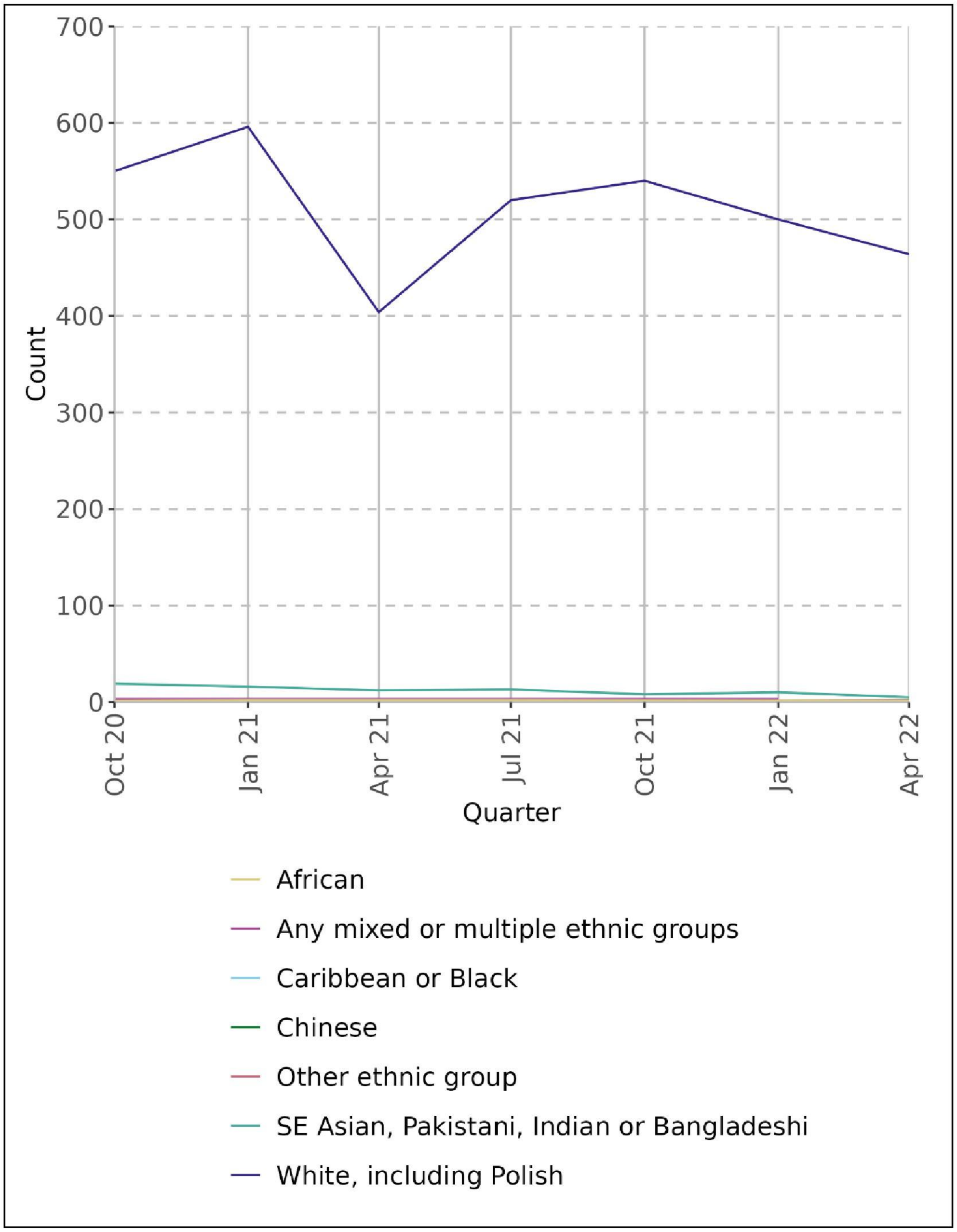
Figure 12: Total number of deaths by sex within ICU/combined units between 1 January 2018 and 30 June 2022.



Source: Data extracted from WardWatcher database.

5.2.10 Figure 13 shows that with ICU patients being largely from the "white" ethnic group, the majority of ICU deaths are from patients in this category. There was a spike in deaths in the 2020/2021 winter period.

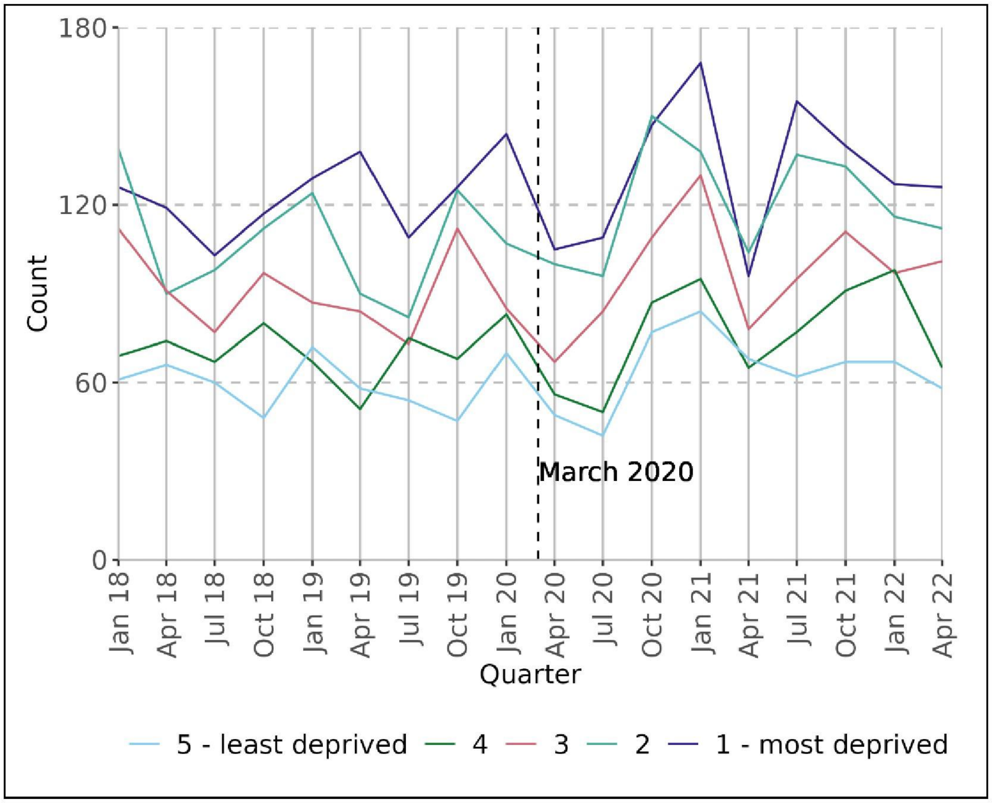
Figure 13: Total number of deaths by ethnicity within ICU/combined units between 1 January 2018 and 30 June 2022



Source: Data extracted from WardWatcher database.

5.2.11 Figure 14 shows that the total number of deaths is highest for those living in the most deprived areas and lowest for those living in the least deprived areas. This is likely due to higher admission numbers for the higher deprivation categories.

Figure 14: Total number of deaths by SIMD quintile within ICU/combined units between 1 January 2018 and 30 June 2022

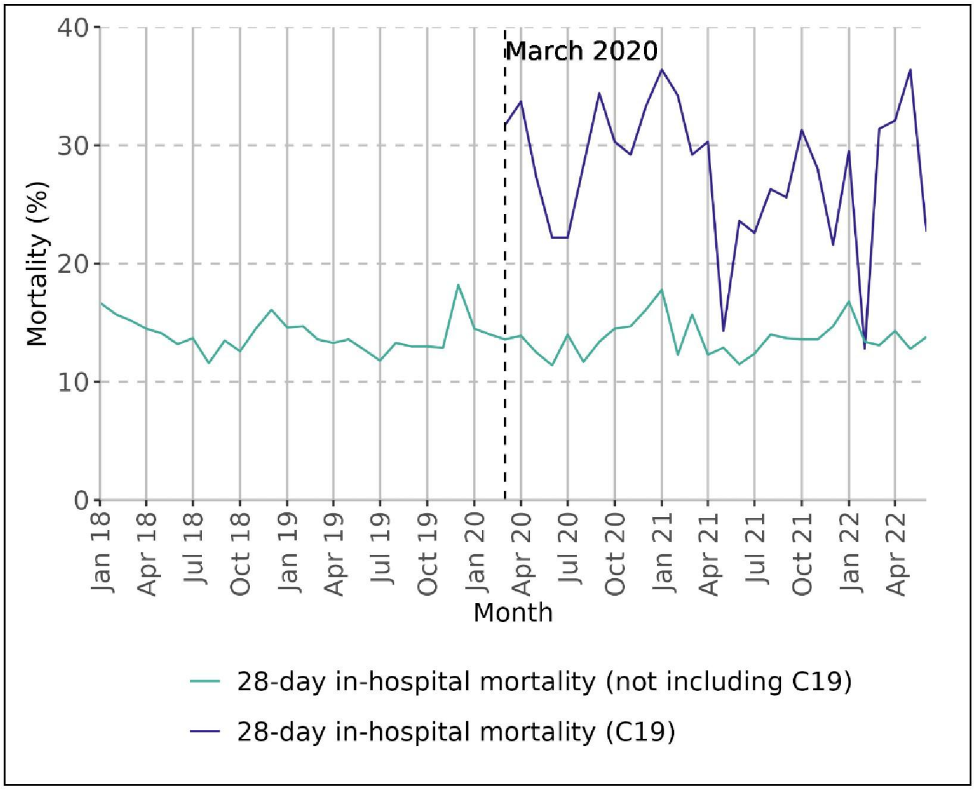


Source: Data extracted from WardWatcher database. Deprivation captured from Scottish Index of Multiple Deprivation (SIMD 2020v2) data zone lookup.

28-day in-hospital mortality

5.2.12 Figure 15 shows that throughout the whole period COVID patients generally had a higher 28 day in-hospital mortality than those with non-COVID-19 related conditions. The mortality of non-COVID patients was steady around 14% each month, both before and during the pandemic. COVID-19 patient mortality was less consistent with the highest at 34% in January 2021 and the lowest 13% in February 2022. The mean 28 day in-hospital mortality by month for COVID-19 patients was 28%.

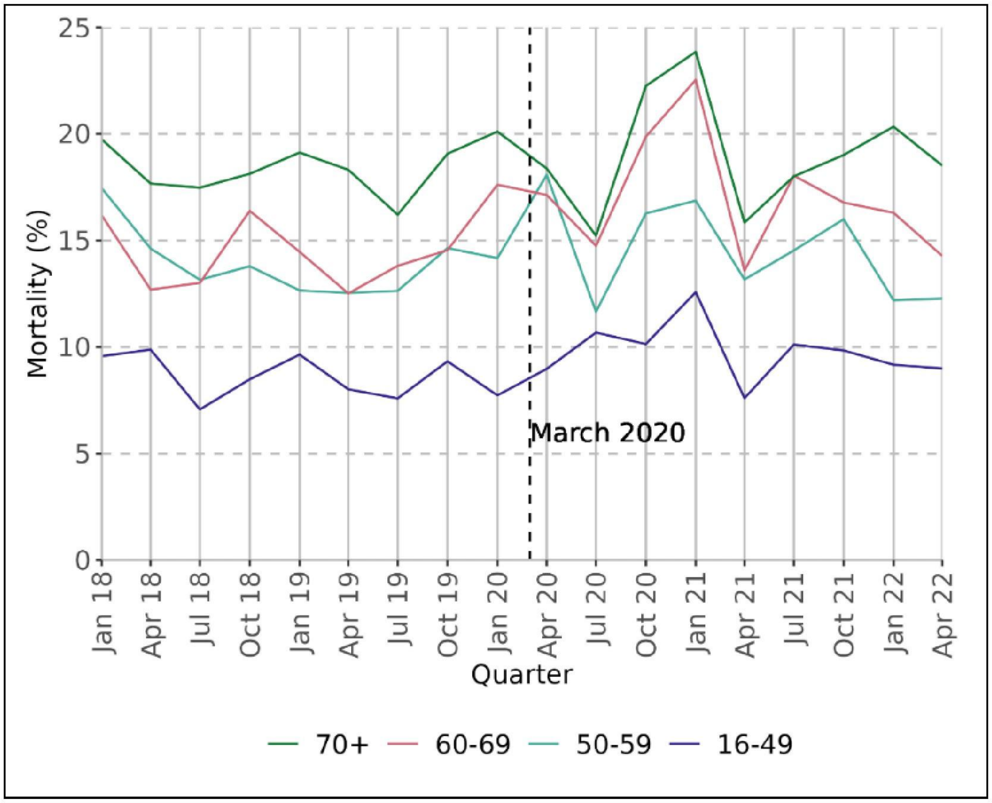
Figure 15: 28 day in-hospital mortality by COVID-19 status within ICU/combined units between 1 January 2018 and 30 June 2022



Source: Data extracted from WardWatcher database.

5.2.13 Figure 16 shows that the 28-day in-hospital mortality has generally remained highest for those in the 70+ age category.

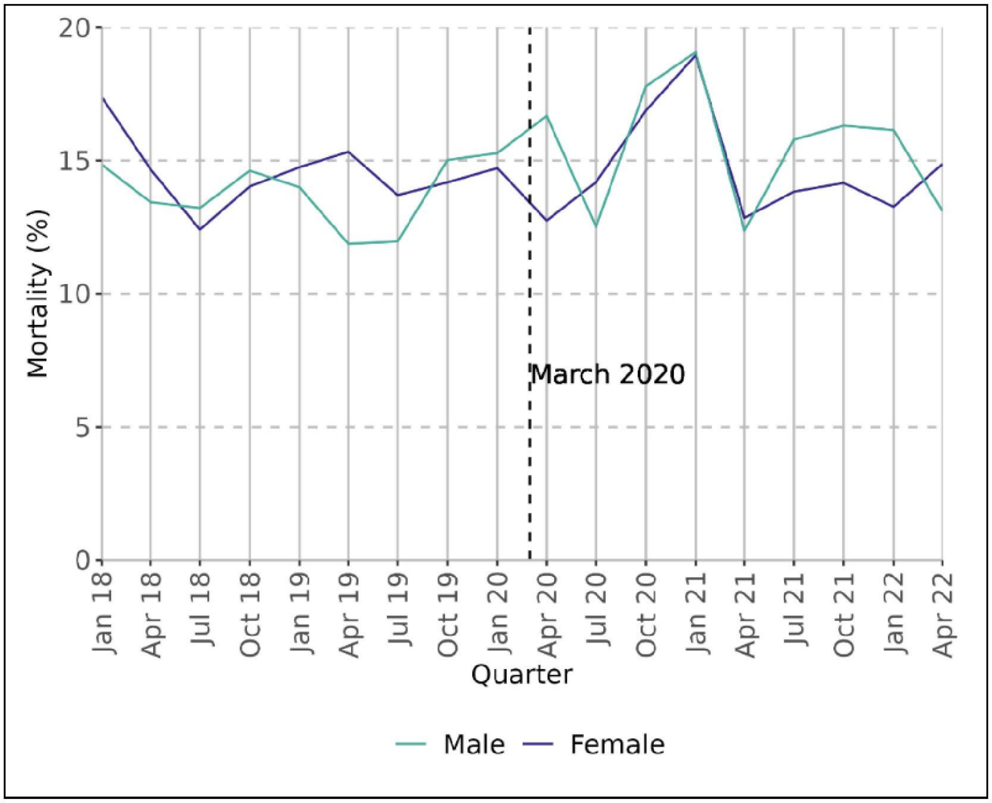
Figure 16: 28 day in-hospital mortality by age group of ICU/combined unit patients between 1 January 2018 and 30 June 2022.



Source: Data extracted from WardWatcher database.

5.2.14 Figure 17 shows that there was a spike in mortality for male patients in March 2020 at the beginning of the COVID-19 pandemic. Otherwise, there is no overall pattern to suggest that mortality is generally higher for either male or female patients throughout the whole period from 2018 to June 2022.

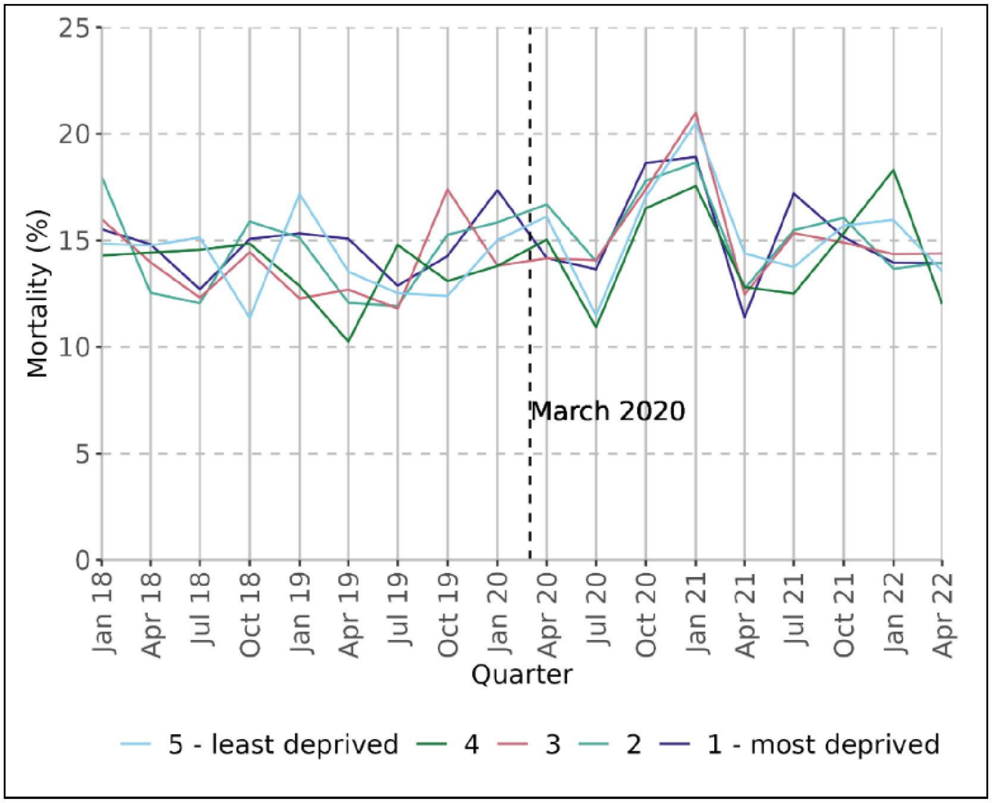
Figure 17: 28 day in-hospital mortality by sex for patients in ICU/combined units between 1 January 2018 and 30 June 2022



Source: Data extracted from WardWatcher database.

5.2.15 Figure 18 shows that there is no overall pattern to suggest that mortality is generally higher or lower for any of the multiple deprivation categories throughout the whole period from 2018 to June 2022. However, the smaller numbers in some of the deprivation categories make definitive interpretation of trends difficult.

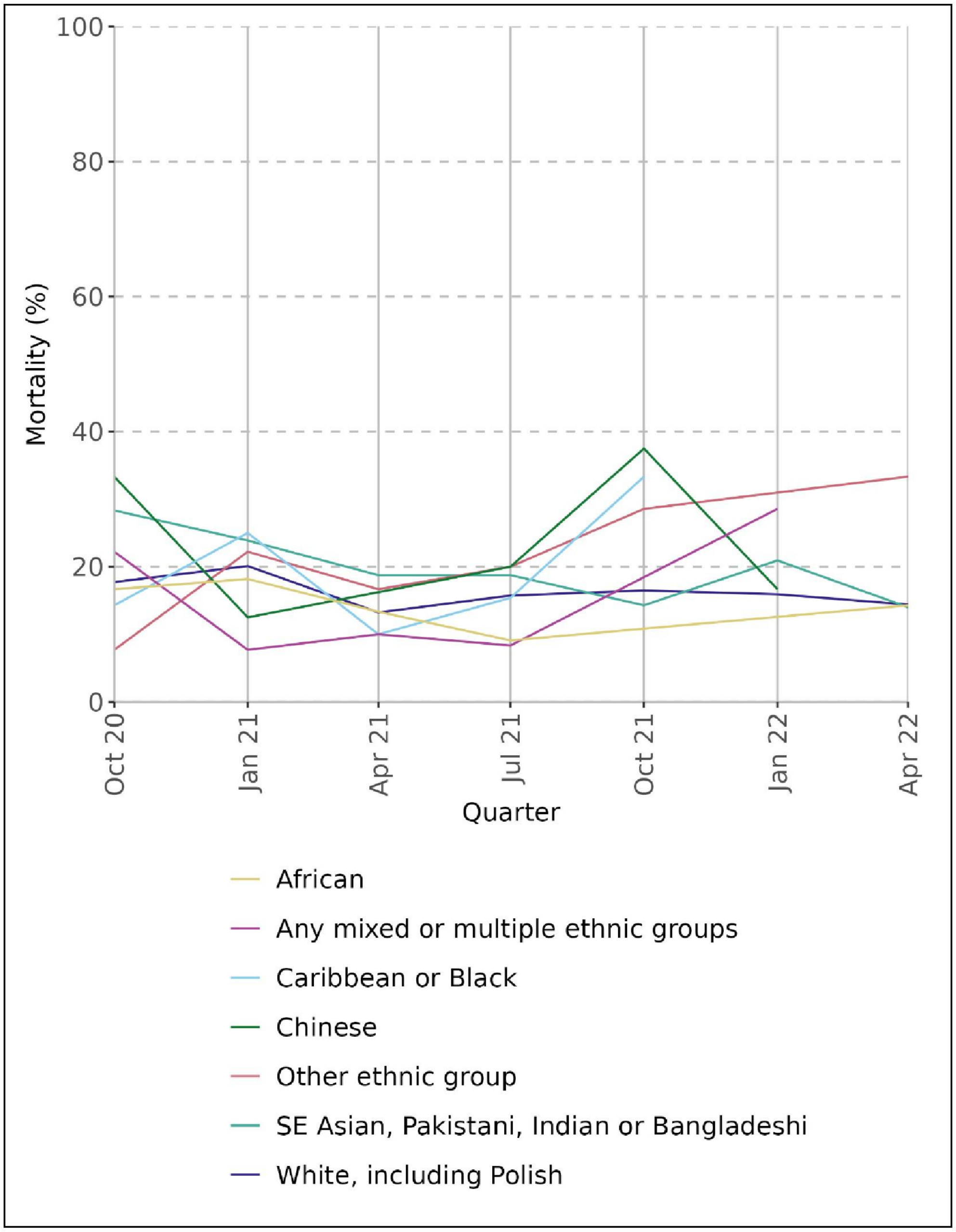
Figure 18: 28 day in-hospital mortality by SIMD of patients in ICU/combined units between 1 January 2018 and 30 June 2022



Source: Data extracted from WardWatcher database. Deprivation captured from Scottish Index of Multiple Deprivation (SIMD 2020v2) data zone lookup.

5.2.16 Figure 19 shows that the 28-day in-hospital mortality rate is not discernibly different for each ethnic group. Recording of ethnicity was not made mandatory until the last quarter of 2020 therefore the data in this graph covers a smaller time frame from 1 October 2020 till 28 April 2022. It should be noted that some ethnic groups are represented by only a small number of patients—therefore the denominator for these groups will be small.

Figure 19: 28 day in-hospital mortality by ethnicity of patients in ICU/combined units between 1 October 2020 and 30 June 2022



Source: Data extracted from WardWatcher database.

6. Data: Critical Care capacity

6.1 Introduction

6.1.1 Many critical care units were not able to open all of their funded beds during the later pandemic period due to staffing challenges, as reported by unit staff in point prevalence surveys (i.e. surveys, sent to the senior charge nurse, on unit nurse staffing numbers in the unit on set days, including data on vacancy and sickness) for the SICSAG COVID-19 reports and SICSAG annual reports (PHS3.2/9 INQ000256631). Working practices in critical care changed during the COVID-19 pandemic, not only with the additional requirement for PPE and the lack of visiting during the first phases of the pandemic, but also the need for additional staff to support the volume of patients who had little or no critical care experience. These changes were reported in one research study to have profoundly affected staff physically, mentally and emotionally (PHS3.2/33 – INQ000477590). As a result Scottish critical care units had a large turnover of staff and difficulty in recruiting and retaining experienced critical care staff for the additional funded beds provided during the pandemic.

6.2 Data

6.2.1 In 2018 there were 10 combined units, containing both level 2 and level 3 beds, and 11 standalone ICUs. As the pandemic progressed, six units combined their standalone ICU and standalone HDUs to create combined units. Queen Elizabeth University Hospital (QEUH) combined ICU and one of their surgical HDU units on 12/10/20, followed by the cardiac units at Edinburgh Royal 10/5/21, Royal Alexandra 1/10/21, Inverclyde Royal 2/11/21, University Hospital Crosshouse 3/11/21 and finally neuro at QEUH 4/11/21. This allowed more flexibility and enabled patients to be ventilated in the previously designated standalone HDU area. This change enabled the separation of patients testing positive for COVID-19 from those testing negative for infection control purposes. By 2022 there were only four units remaining as standalone ICUs.

6.2.2 The figures in Table 8 were collected as part of an annual return to SICSAG in November of each year (see Table 1 for explanation of bed level categories). Table 8 demonstrates that funded level 3 beds increased from 2018 to 2022. The increase in level 2 beds was, in part, driven by the redesignation of standalone HDUs as combined units by combining standalone ICUs and HDUs.

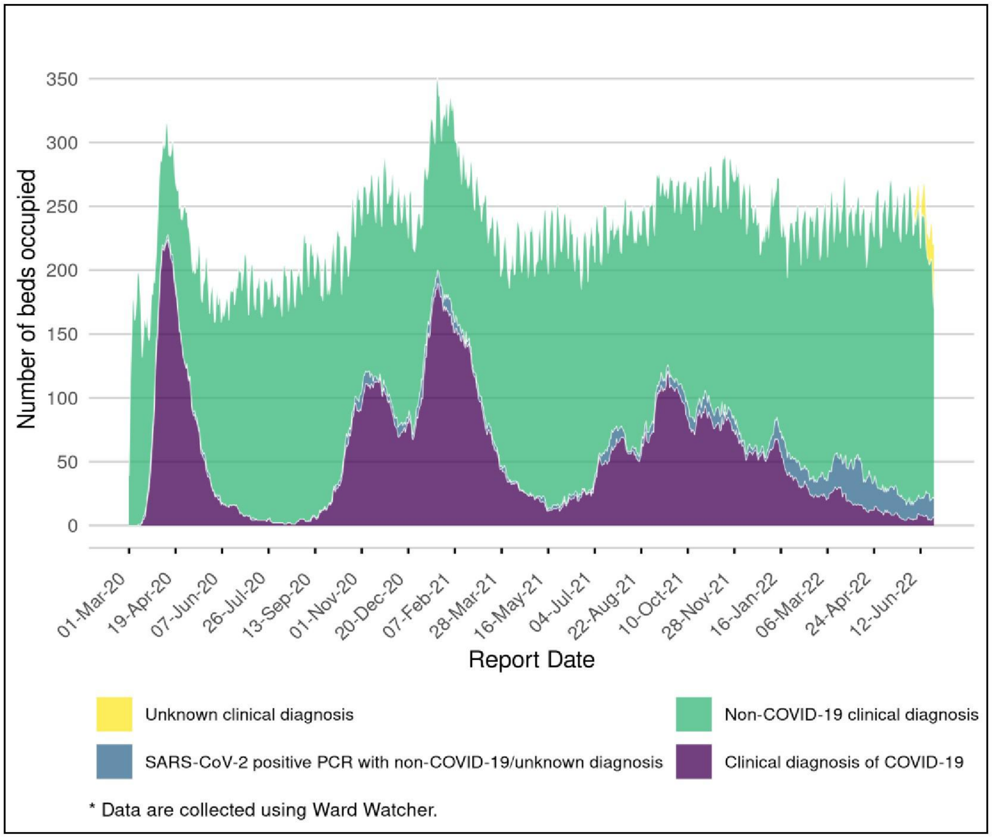
Table 8: Funded beds in Critical Care in Scotland pre-pandemic and during the pandemic.

Year	2018	2019	2020	2021	2022
Total number funded level 3 beds in the stand alone and combined ICU/HDU units.	188.3	189.3	190.13	191.88	218.5
Additional funded number level 2 beds in a combined ICU/HDU unit	63	63	97.9	119.2	120.5
Total number of beds in critical care for standalone ICU and combined units	251.3	252.3	288.03	311.08	339

Source: Data extracted from WardWatcher database.

6.2.3 Figure 20 shows the occupancy by day from 1 March 2020 to 26 April 2022. COVID-19 related ICU admissions were identified as a patient who tested positive for COVID-19 at any time in the 21 days prior to admission to ICU, or who tested positive from the date of admission up to and including the date of ICU discharge.

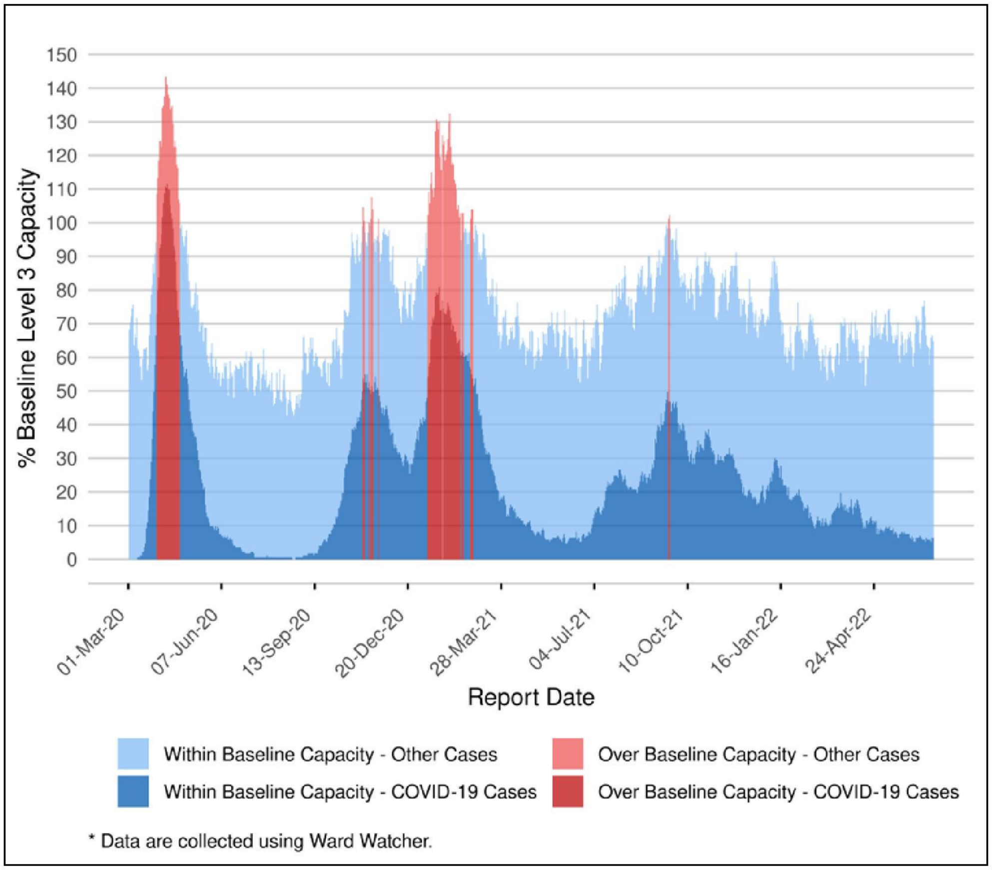
Figure 20: Daily number of occupied ICU/combined units beds by clinical COVID-19 status between 01 March 2020 and 28 June 2022



Source: Data extracted from WardWatcher database (COVID-19 test results extracted from Electronic Communication of Surveillance in Scotland (ECOSS) database).

6.2.4 Figure 21, Table 9 and Figure 22 highlight periods between 01 March 2020 and the end of June 2022 where the number of level 3 patients exceeded baseline capacity in critical care units. This means there were more patients than the number of funded beds available to the units. Funding is based on one nurse for each level 3 bed. Figure 21 shows in red where there were more patients than there were critical care staff to look after them on a 1:1 basis. It can be seen from Figure 22 that the West network generally suffered more with capacity issues than the North and East networks, though all three networks had periods of excess patients.

Figure 21: Bar chart detailing patients receiving level 3 care as a percentage of baseline capacity by covid status between 01 March 2020 and 28 June 2022



Source: Data extracted from WardWatcher database.

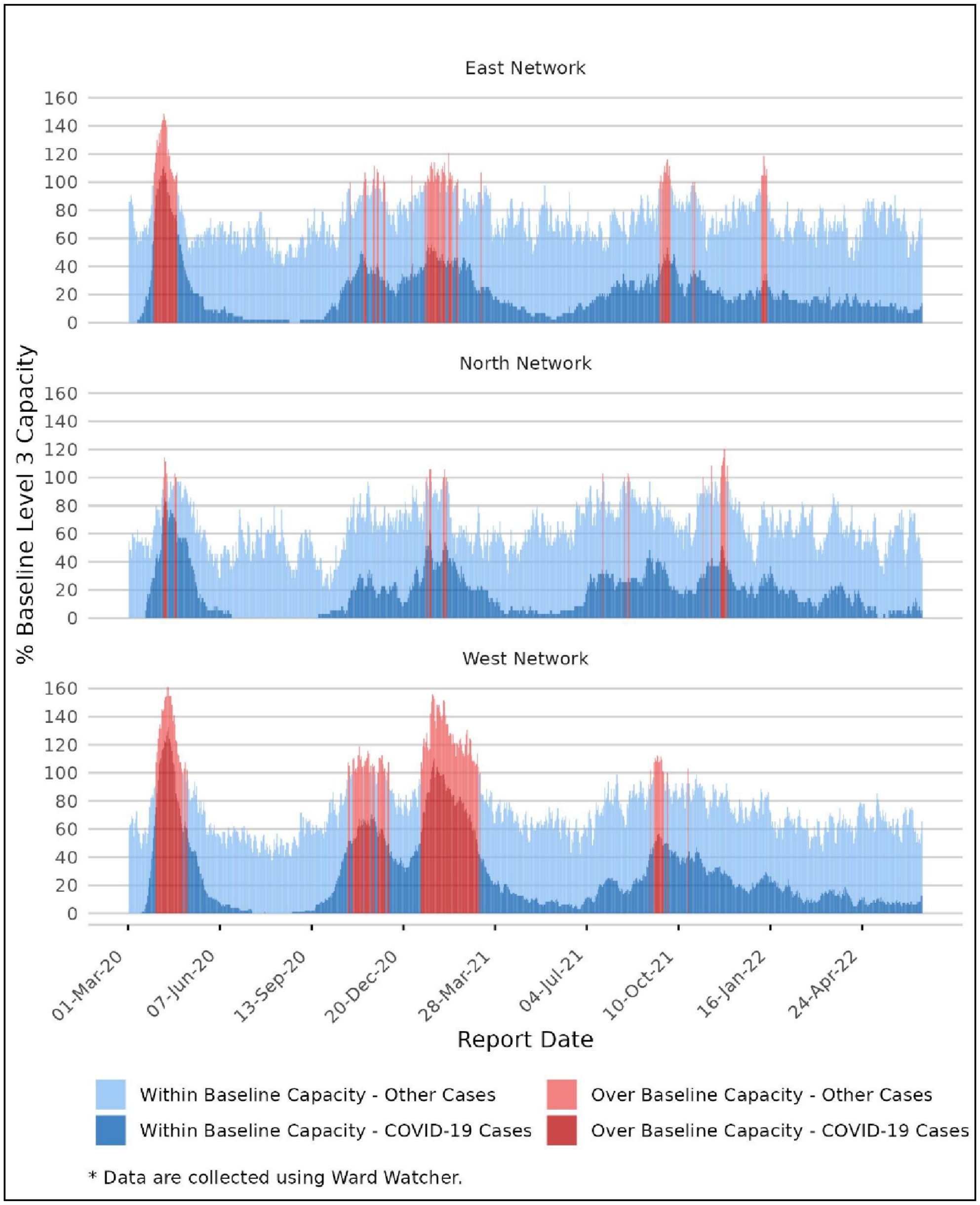
Table 9: Patients receiving level 3 care as a percentage of baseline capacity between 01 March 2020 and 28 June 2022

Month	COVID patients	Other patients
Mar 2020	14.5%	52.1%
Apr 2020	88.3%	30.9%
May 2020	27.3%	43.1%
Jun 2020	5.7%	49.9%
Jul 2020	1.1%	53.7%
Aug 2020	0.5%	47.8%
Sep 2020	3.3%	55.7%
Oct 2020	26.5%	49.1%
Nov 2020	49%	48.1%
Dec 2020	32%	47.4%
Jan 2021	63.4%	46.4%

Month	COVID patients	Other patients
Feb 2021	62.8%	43.1%
Mar 2021	30.8%	50.9%
Apr 2021	12.5%	54.1%
May 2021	6.8%	58.3%
Jun 2021	6.5%	56.5%
Jul 2021	18.9%	52.6%
Aug 2021	22.9%	57.2%
Sep 2021	40.5%	50%
Oct 2021	34.3%	48.7%
Nov 2021	30.9%	51.4%
Dec 2021	20%	54.1%
Jan 2022	23%	49.2%
Feb 2022	14.3%	51.8%
Mar 2022	14%	49.2%
Apr 2022	12.2%	52.6%
May 2022	8.4%	58.7%
Jun 2022	7.9%	55.2%

Source: Data extracted from WardWatcher database.

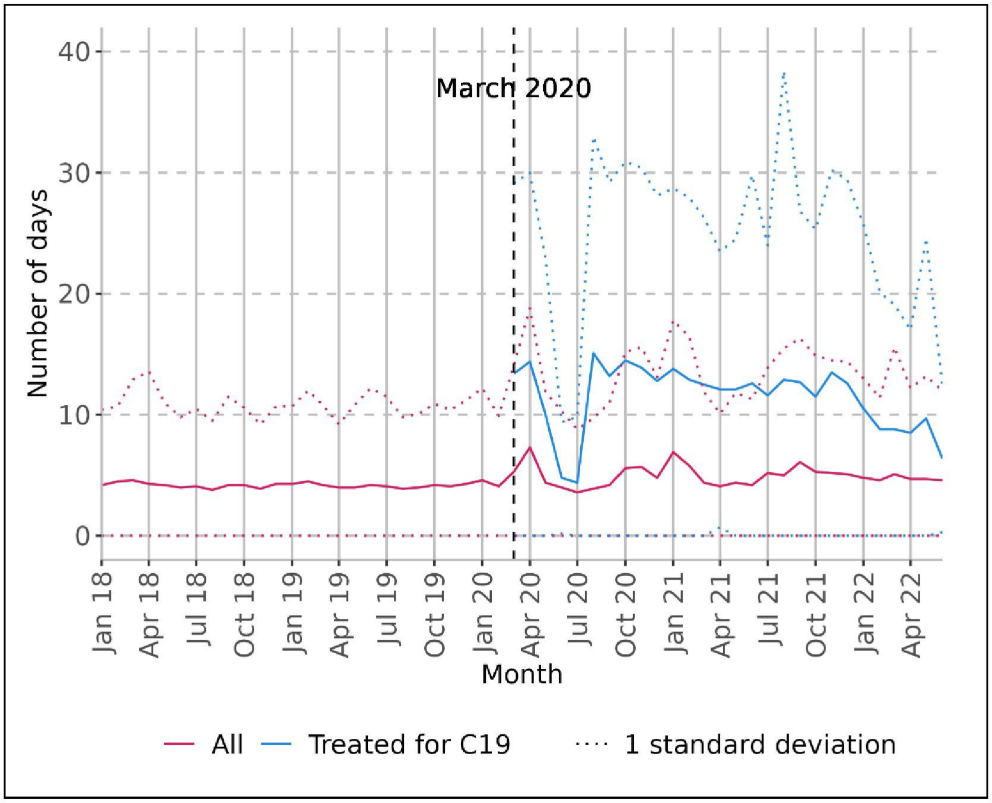
Figure 22: Patients receiving level 3 care as a percentage of baseline capacity by Network and COVID status between 01 March 2020 and 28 June 2022



Source: Data extracted from WardWatcher database.

6.2.5 Figure 23 shows that there were small spikes in mean length of stay for all patients after the start of the COVID-19 pandemic, but the numbers generally remained steady around the 4 or 5 days mark. COVID patients generally had a higher mean length of stay around 13 or 14 days, with a large dip in the warmer period of 2020 and a small dip beginning to appear in 2022.

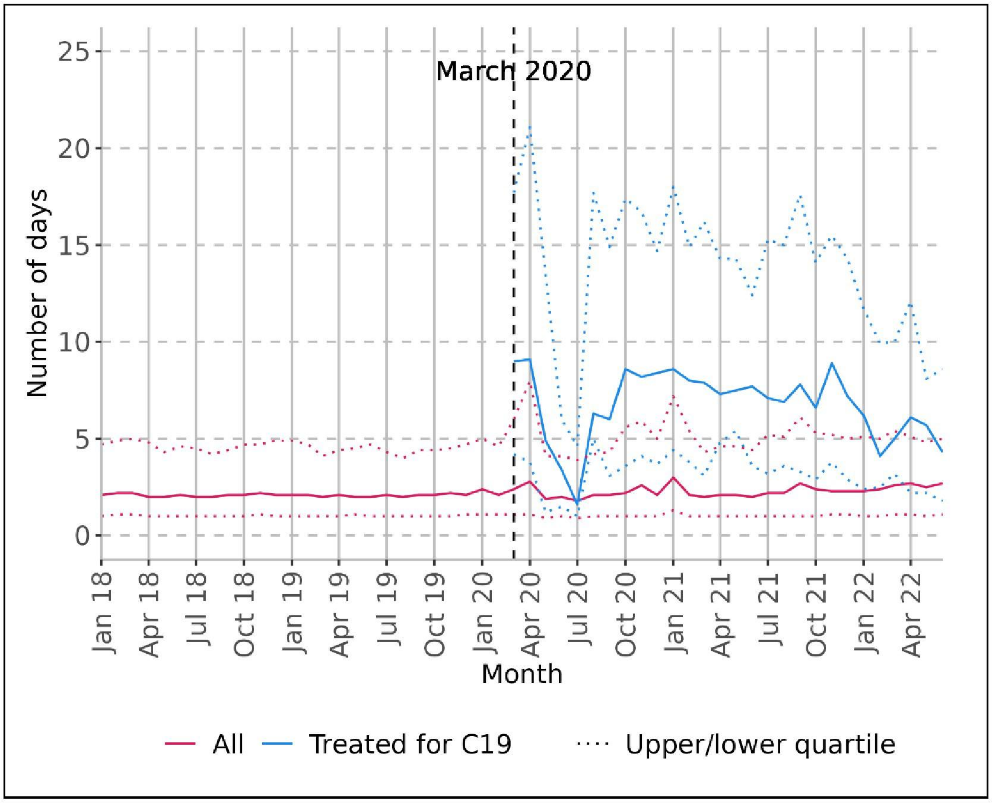
Figure 23: Mean length of stay in ICU with health condition between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

6.2.6 Figure 24 shows that the median length of stay for all ICU patients has remained consistent at around 2 or 3 days. COVID patients generally had a higher median length of stay around 8 or 9 days, with a large dip in the warmer period of 2020 and a small dip beginning to appear in 2022.

Figure 24: Median length of stay in ICU/combined units with health condition between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

6.2.7 Table 10 shows a breakdown of average lengths of stay for different demographics across all ICU/combined admissions. By age, the longest lengths of stay appear to occur in the 50-59 age category. The 70+ age category shows a markedly lower mean length of stay than other age groups while its median length of stay is similar to other age groups. By deprivation, there are not large differences in either mean or median lengths of stay between the different SIMD quintiles. By sex, males have a slightly longer mean length of stay than females with a nearly identical median length of stay. By ethnicity, there are large differences in the average lengths of stay which is likely due to the small numbers associated with non-white patient cohorts.

Table 10: Demographics for length of stay for patients admitted to ICU/combined units (01 January 2018 to 28 June 2022)

Demographic	Category	Mean length of stay	Median length of stay (upper quartile, lower quartile)
Age group	16-49	4.6	2 (1, 4.6)
	50-59	5.1	2.5 (1.1, 5.5)
	60-69	4.8	2.3 (1, 5)

Demographic	Category	Mean length of stay	Median length of stay (upper quartile, lower quartile)
	70+	3.9	2.1 (1, 4.4)
Ethnicity	African	9.2	3.7 (1.7, 8.8)
	Any mixed or multiple ethnic groups	6.7	2.9 (1.5, 6)
	Caribbean or Black	9.6	3 (1.8, 10.3)
	Chinese	7	4.2 (2.1, 7.1)
	Other ethnic group	8	3.8 (1.6, 8.8)
	SE Asian, Pakistani, Indian or Bangladeshi	8.4	3.9 (1.7, 9)
	White	5	2.4 (1, 5.2)
	Refused/not provided by patient	2.6	1.8 (0.9, 3)
	Unknown	4.1	2.1 (1, 4.5)
Scottish Index of Multiple Deprivation	1 - most deprived	4.9	2.3 (1, 5.2)
	2	4.5	2.1 (1, 4.9)
	3	4.3	2.1 (1, 4.7)
	4	4.4	2.1 (1, 4.6)
	5 - least deprived	4.7	2.1 (1, 4.8)
	Unknown	4.3	2.1 (1.1, 4.7)
Sex	Female	4.3	2.1 (1, 4.7)
	Male	4.7	2.2 (1, 4.9)

A quartile is a statistical term that describes a division of observations into four defined intervals based on the values and nature of the data and how they compare to the entire set of observations. For ordered data - e.g. length of stay - the quartiles partition the data into four equally sized sets: 25% of datapoints are less than or equal to the lower quartile, a further 25% are less than or equal to the median, a further 25% are less than or equal to the upper quartile, and the final 25% are greater than the upper quartile.

Source: Data extracted from WardWatcher database. Deprivation captured from Scottish Index of Multiple Deprivation (SIMD 2020v2) data zone lookup.

6.2.8 Table 11 shows a breakdown of average lengths of stay for different demographics across ICU/combined admissions with confirmed COVID-19. Generally, lengths of stay for COVID-19 patients were much higher than non-COVID patients (Table 10). By age, the 50-59 and 60-69 age categories had the longest lengths of stay with similar averages. The 70+ age category had the lowest mean length of stay, similar to non-COVID patients. By deprivation, there are not large differences in either mean or median lengths of stay between the different SIMD quintiles. By sex, males have longer mean and median lengths of stay than females. By ethnicity, there are again large differences in the average lengths of stay which is likely due to the small numbers associated with non-white patient cohorts.

Table 11: Demographics for length of stay for COVID-19 patients admitted to ICU/combined units between 01 March 2020 and 28 June 2022

Demographic	Category	Mean length of stay	Median length of stay (upper quartile, lower quartile)
Age group	16-49	11.6	6.1 (2.7, 13.1)
	50-59	13.8	8.5 (3.8, 18.2)
	60-69	14.1	9 (3.9, 18.6)
	70+	10.3	6.9 (3.3, 13.2)
Ethnicity	African	17	8.8 (3.9, 20.8)
	Any mixed or multiple ethnic groups	16.7	8.2 (4.3, 17.9)
	Caribbean or Black	19.9	13.5 (8, 26.9)
	Chinese	16.5	16.3 (5.3, 17.9)
	Other ethnic group	18	16 (8, 24.2)
	SE Asian, Pakistani, Indian or Bangladeshi	14.1	8.6 (4.5, 17.6)
	White	12.9	7.8 (3.5, 16.1)
	Refused / not provided by patient	6.1	3.9 (1.2, 7.6)
	Unknown	7.6tra	4.5 (1.8, 10.7)
Scottish Index of Multiple Deprivation	1 - most deprived	13.1	7.9 (3.5, 17)
	2	12.1	7.6 (3.4, 15.1)
	3	12.2	7.3 (3.4, 15.5)
	4	12.9	7.9 (3.3, 16.4)
	5 - least deprived	14	7.6 (3.5, 17.4)
	Unknown	12.7	7.4 (3.7, 12.3)
Sex	Female	11.9	7 (3.2, 15)
	Male	13.2	8.1 (3.6, 16.8)

Source: Data extracted from WardWatcher database. Deprivation captured from Scottish Index of Multiple Deprivation (SIMD 2020v2) data zone lookup.

6.2.9 Table 12 and Figure 25 show counts of inter-hospital critical care transfers (meaning a transfer to ICU/combined unit or HDU) by quarter. From the beginning of 2018 to the middle of 2019 the number of transfers was consistently between 100 and 119, with the highest number occurring in the July 2019 quarter. There was then a significant drop in transfers lasting for a year until July 2020 quarter. From then the transfers were typically higher between 110 and 120 until October 2021 when the number of transfers dropped down to 79 and remained slightly lower until June 2022.

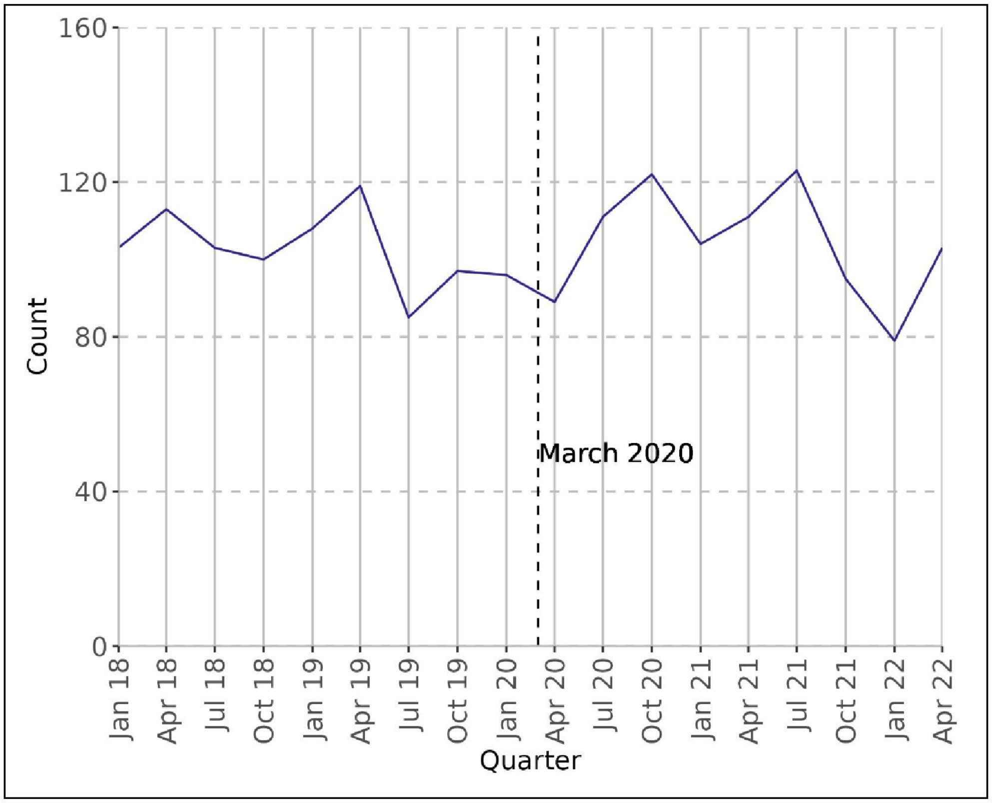
6.2.10 SICSAG does not hold data to indicate whether any transfers took place into other parts of the United Kingdom (i.e. outside of Scotland).

Table 12: Total number of critical care transfers by quarter from ICU/combined between 01 January 2018 and 28 June 2022

Quarter beginning	Number of inter-hospital critical care transfers
01/01/2018	103
01/04/2018	113
01/07/2018	103
01/10/2018	100
01/01/2019	108
01/04/2019	119
01/07/2019	85
01/10/2019	97
01/01/2020	96
01/04/2020	89
01/07/2020	111
01/10/2020	122
01/01/2021	104
01/04/2021	111
01/07/2021	123
01/10/2021	95
01/01/2022	79
01/04/2022	103

Source: Data extracted from WardWatcher database.

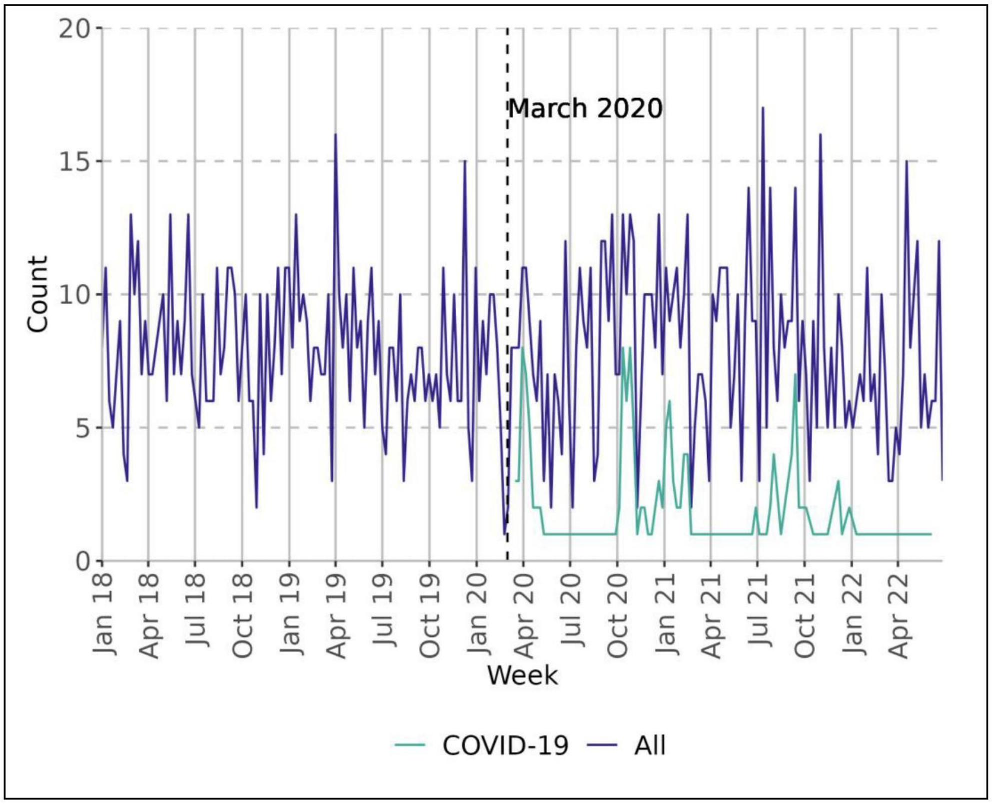
Figure 25: Total number of critical care transfers from ICU/combined between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

6.2.11 Figure 26 shows the number of transfers out of ICU/combined broken down by COVID-19 patients and all patients. The number is broken down by week and it can be seen that the number of transfers occurring each week was fairly erratic. There were spikes in admissions for COVID-19 admissions in April 2020, October 2020 lasting until about March 2021, then July 2021 lasting until about January 2022.

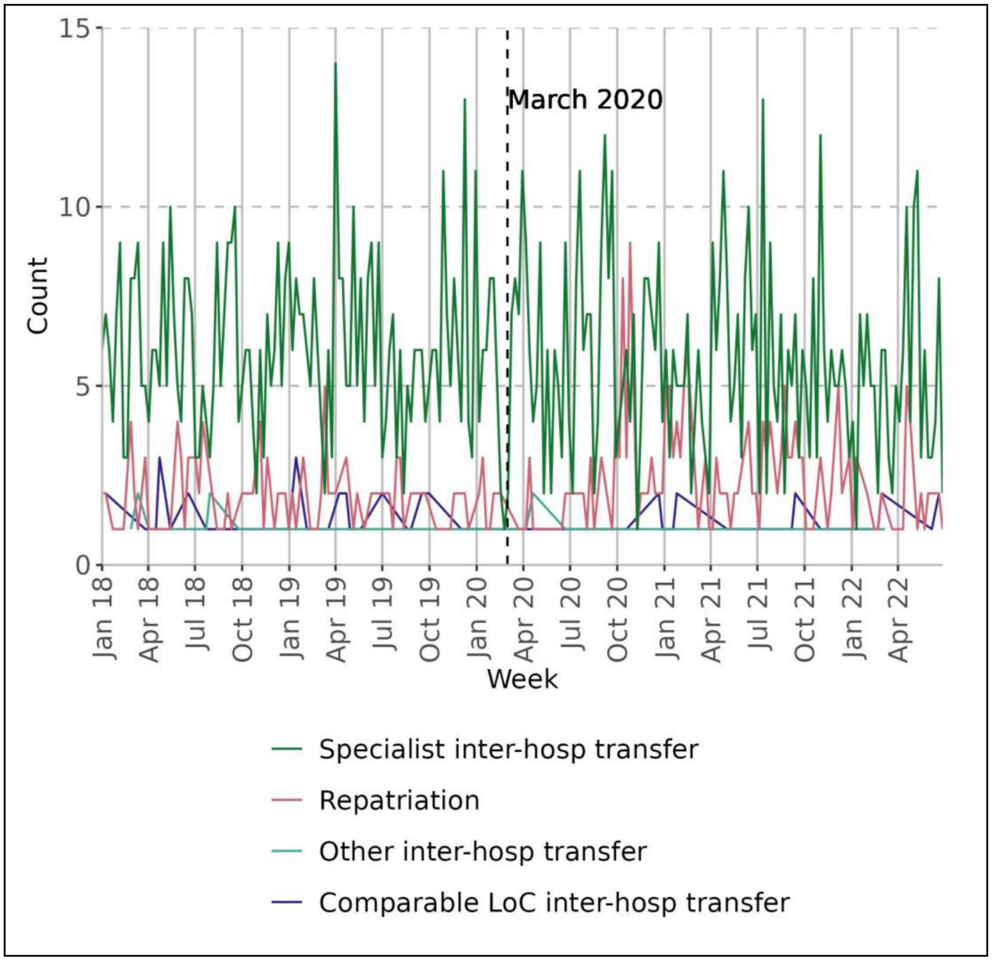
Figure 26: Total number and number of COVID-19 critical care transfers from ICU/combined units between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

6.2.12 Figure 27 shows that during the period 1 March 2020 to 28 June 2022 there was an increase in the numbers of transfers between critical care units due to capacity issues within the units. The increase in the number of transfers can also be seen in Figure 22 where the demand exceeds available beds during peak occupancy of patients with COVID-19. Patients transferred for repatriation increase during the pandemic. The proportion transferred for comparable Level of Care (LoC) was consistent before and during the pandemic.

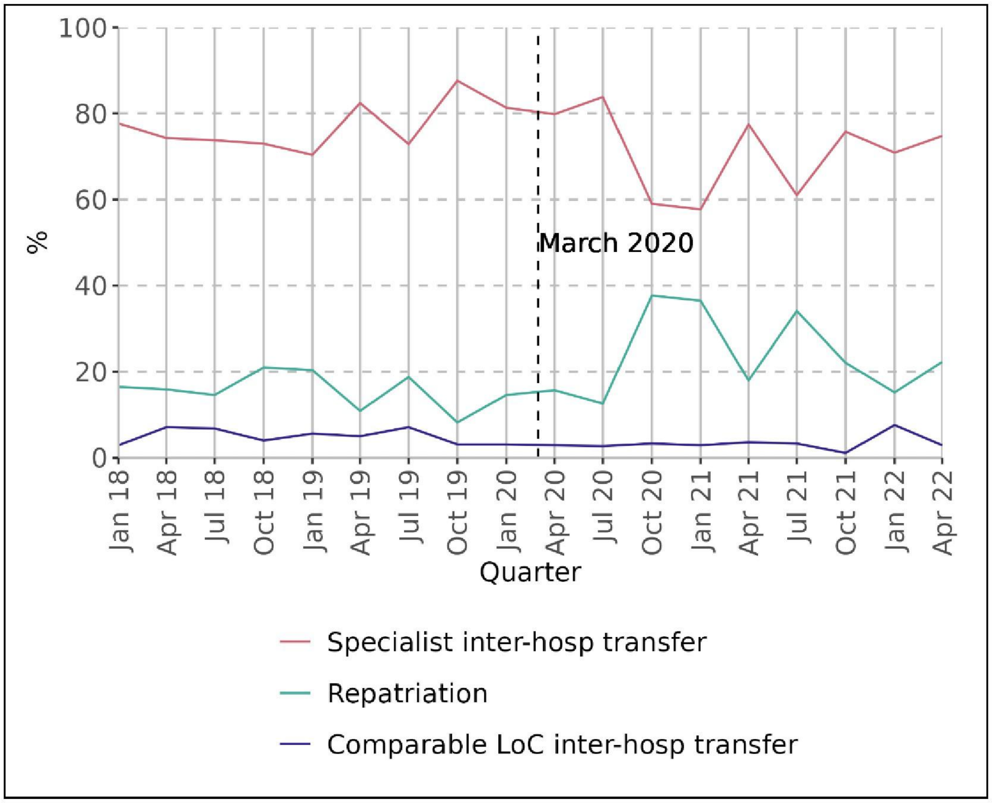
Figure 27: Breakdown of number of critical care transfers from ICU/combined between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

6.2.13 Figure 28 shows the number of inter-hospital transfers broken down by specialist transfer, repatriation and comparable Level of Care (LoC). Specialist transfer is consistently the highest reason for transfer from these categories, followed by repatriation and then comparable LoC. From October 2020 the proportion of repatriation transfers increased while the proportion of specialist transfers decreased and this remained fairly consistent with an apparent return to previous proportions from April 2022.

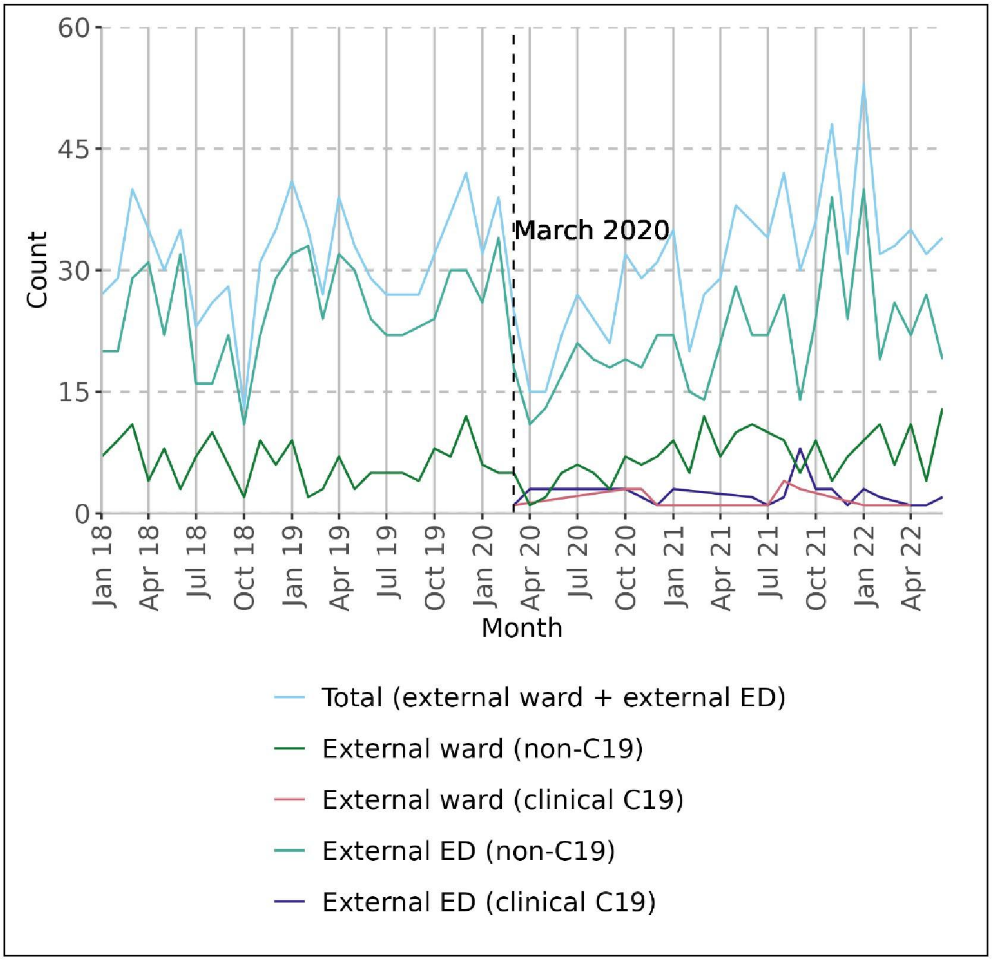
Figure 28: Types of inter-hospital transfers from ICU/combined units between 01 January 2018 and 28 June 2022



Source: Data extracted from WardWatcher database.

6.2.14 Figure 29 shows that both COVID-19 and non-COVID-19 patients were typically admitted from Emergency Departments (EDs) in other hospitals more than they were admitted from wards in other hospitals.

Figure 29: Number of ICU/combined patients who were transferred from ED or ward in another hospital from 01 January 2018 to 28 June 2022



Source: Data extracted from WardWatcher database.

6.2.15 SICSAG does not hold data requested by the Inquiry on:

a) staffing ratios

b) the number of critical care nurses working in ICU

c) the number of bedside registered nurses working in ICU

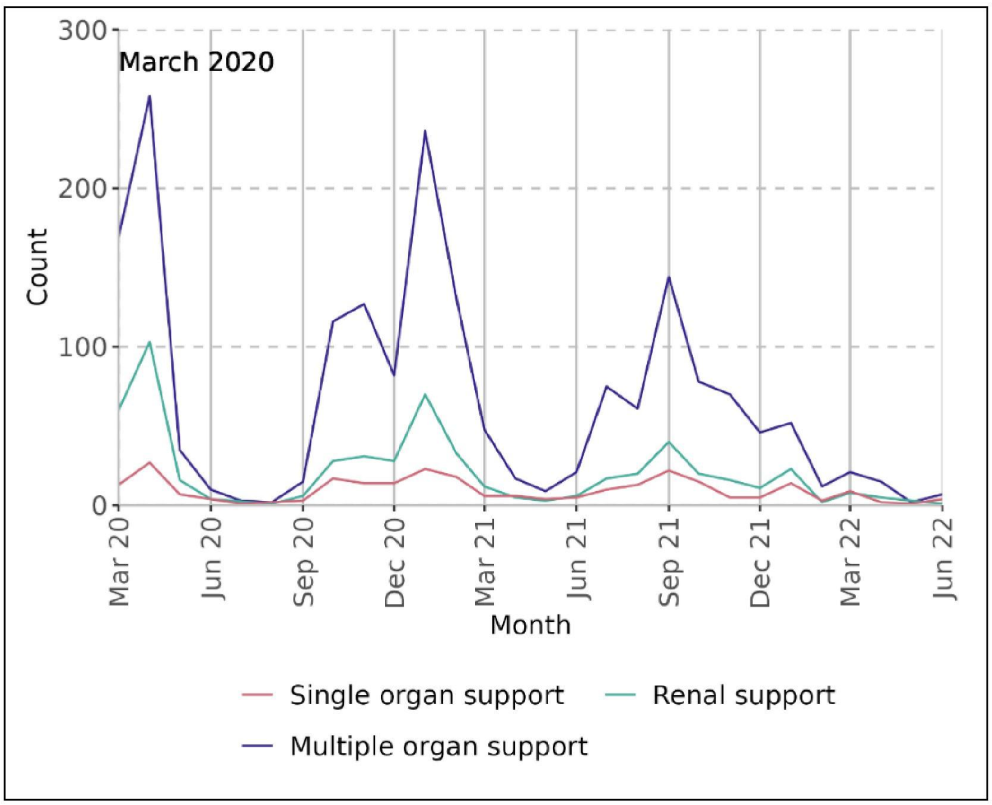
d) the number of intensive care consultants, other senior doctors (associate specialists, specialty doctors, staff grade and specialty registrars), and doctors in training (core trainees, foundation doctors) working in ICU

e) the staff to critical care Level 2 and Level 3 patient ratios within ICU with respect to each of the individual types of clinical staff role mentioned at b to d above.

7. Data: Organ support

7.1.1 Figure 30 shows that in ICUs in Scotland most COVID-19 patients had multiple organs supported. Renal support patients are also classified as either single or multiple organ support patients, and therefore since the number of COVID-19 patients on renal support is consistently higher than the number on single organ support this indicates that renal support patients typically received additional forms of organ support. In fact, in the period from 01 March 2020 to 28 June 2022, 96% of COVID-19 patients receiving renal support were classified as multi-organ support patients.

Figure 30: Number of admissions receiving different types of organ support in ICU/combined units for patients admitted with COVID-19 between 01 March 2020 and 28 June 2022



Source: Data extracted from WardWatcher database.

Statement of Truth

I believe that the facts stated in this witness statement are true. I understand that proceedings may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief of its truth.

Signed: **Personal Data**

Paul Johnston
Chief Executive Officer

Date: 21/5/24

Signed: **Personal Data**

Scott Heald
Director of Data and Innovation

Date: 21/5/24

Signed: **Personal Data**

Nicholas Phin
Director of Public Health Science

Date: 21/5/24