HAVE WE LEARNT THE RIGHT LESSONS? INTENSIVE CARE CAPACITIES DURING THE COVID-19 PANDEMIC IN EUROPE

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Summary: Intensive care capacity proved critical during the COVID-19 pandemic with many countries observing shortages of beds, medical equipment, and specialised health professionals. Strategies to surge capacities ranged from postponement of elective treatments, creation of temporary hospitals and tapping resources from private hospitals. National and international hospital networks and transfer of critically ill patients proved important as did telemedical solutions and international training programmes to maintain best levels of intensive care. Stronger coordination at EU level to allocate patients and staff across borders might facilitate better management of high demand on ICU wards.

Keywords: Intensive Care Capacity, ICU Beds, Hospitals, Physical Infrastructure, COVID-19

Introduction

Hospitals and intensive care capacities have arguably received more attention from policymakers and the general public during the COVID-19 pandemic than ever before. In many European Union (EU) countries, intensive care wards were heavily stretched, not only in terms of physical infrastructure such as beds and medical equipment (e.g. ventilators), but much more in terms of having specialised health professionals available that could keep these beds operable. Many countries reported a shortage of intensive care capacities for patients with COVID-19, especially during the early stages of the pandemic, but also during subsequent waves.

This article describes how countries in the EU created surge capacity of intensive care beds and managed intensive care unit (ICU) capacity to ensure access to critical care, not only for COVID-19 cases but for all other patients in need of this kind of care. It identifies which structural adoptions countries retained from their experiences during the first wave of COVID-19 and highlights any room for improvement with regards to enhanced cross-border coordination of intensive care capacities.
Countries had to increase intensive care surge capacity quickly

At the outset of the COVID-19 pandemic in March 2020, the rapidly rising number of patients with COVID-19 requiring acute and intensive care created an extraordinary overload and demand on hospitals, especially ICUs, across the EU. All countries therefore prepared and implemented plans to create surge capacities to ensure sufficient physical infrastructure and to mobilise the health workforce at the start of the COVID-19 pandemic.

The most common strategy to free up significant numbers of beds and staff in intensive care wards was the postponement of elective treatments and surgeries. This enabled hospitals to reallocate critical care beds that usually accommodate post-operative patients from major surgery to the care of patients with COVID-19. Most countries reallocated resources from other units (such as post-surgery recovery units and neonatal ICUs) and adapted surgical beds with monitoring equipment, oxygen equipment and ventilators.

Moreover, countries designated specific hospitals to transform wards to treat COVID-19 cases, in particular in Eastern Europe. In Croatia, for example, specific hospitals and wards were designated as COVID-19 facilities during the first wave. In many countries with an important private hospital sector such as Greece, Ireland, Italy and Spain, governments requested private hospitals to make their ICU beds available. In the Italian region of Lombardy, ICU beds in private hospitals represented about 30% of total ICU surge capacity and in Spain 15% of these capacities were used during the first wave. In some countries, such as France, Hungary, Romania, Slovenia and Spain temporary field hospitals were set up either by the army or with support from local authorities or non-governmental organisations to create more ICU beds. Greece and Italy were also able to utilise ICU beds provided by military hospitals.

The initial availability of intensive care beds varied across EU countries

To understand how countries responded to the COVID-19 crisis and the rapidly rising numbers of COVID-19 patients requiring intensive care, the initial starting point of ICU bed capacity is important to consider, although the definition of ICU beds is often different from one country to another. Prior to the outbreak, ICU bed capacity varied widely across countries, ranging from 4 to 5 ICU beds per 100,000 in Finland, Greece, Malta and Sweden up to 29 in Austria and 33 in Germany.

In anticipation of a rise in demand for care, many countries managed to rapidly increase the number of ICU beds. Malta, for example, increased the number of ICU beds five-fold from 20 to over 100 beds, with ICU beds from different wards also converted into ICU beds for COVID-19 patients which were used at the peak of the second wave in March 2021. Countries with an initial low capacity of ICU beds, such as Greece, Ireland, Netherlands and Sweden doubled their ICU bed capacities to respond to rapidly rising patient numbers during the first wave. France, which had more ICU beds per population than many other EU countries to begin with, also managed to double the number of ICU beds with ventilators that allowed them to accommodate the most severely ill patients until April 2020 from 5,400 to 10,700 ICU beds.

Countries moved patients across regions and borders to ensure appropriate management of ICU capacities

To alleviate pressure from particularly strained intensive care wards, critically ill patients were transferred from the hardest-hit regions to areas with spare capacity within or across countries. In the Netherlands, up to 100 patients per day were transferred across regions within the country at the end of March 2020. This was coordinated by the army that used ambulances, mobile ICUs, a special ICU bus and two helicopters to ensure safe patient transfers. The Netherlands also transferred 55 intensive care patients to Germany and included the use of ICU beds in Germany in preparation plans for the second wave. In-country transfer of
ICU COVID-19 patients also took place in many other countries such as Belgium, Denmark, France, Germany, Greece, Portugal and Sweden. During the first wave in France, patients from Paris, the regions Grand Est, Bourgogne-Franche Comté and Corse were transferred by medically equipped TGVs (France’s intercity high-speed rail service) or boat/plane to less-overwhelmed north-western and south-western regions. Between March 22 and April 5, 2020, 160 patients were transferred from France to neighbouring countries of the Grand-Est Region or other European countries.

Hospital networks proved important from the beginning of the pandemic

Hospital networks, both within countries and across borders, were important in the management of acute care and ICU surge capacity. In Lombardy, Italy, the ICU network that initially contained 15 hospitals in February 2020 quickly expanded to 72 facilities in the following weeks, creating in total 482 new ICU beds within the first two weeks of March 2020. Similarly in Estonia, the existing hospital network which links smaller hospitals with the large North Estonia Medical Centre and Tartu University Hospital proved crucial in creating the necessary ICU surge capacity to meet population needs. Cross-border cooperation between health providers and authorities that existed before the pandemic supported the exchange of information and patients (see Box 1).

Box 2: A cross-regional coordination mechanism in Germany aimed to prevent ICUs from collapsing

Throughout the first and then subsequent waves, many countries set up monitoring systems and central coordinating mechanisms to assess the number of free ICU beds at different levels and to steer COVID-19 patients requiring intensive care across the country. During the second wave in Slovenia, a special coordinator was appointed to manage hospital capacity and provide real-time data. In the Netherlands, the National Coordination Centre for Distribution of Patients took on a steering role in June 2020 to allocate COVID-19 patients among Dutch hospitals. In Germany, a central coordination mechanism was developed by the federal and regional governments in collaboration with intensive care physicians to distribute COVID-19 patients in ICU care across the country (see Box 2).

With experiences accumulated during the first wave, countries developed planning tools for more adaptive ICU surge capacity

During the summer of 2020, with decreasing numbers of COVID-19 patients in most countries, many hospitals scaled back the number of ICU beds designated for COVID-19 patients. Increasing experience and understanding on length of stay, treatment options and resource use of COVID-19 patients, also enabled policymakers and hospital planners to apply more flexible and adaptive approaches to respond to COVID-19 cases. In subsequent COVID-19 waves, countries used the incidence as a benchmark to free up acute and intensive care capacities in more affected regions. Bulgaria and Belgium, for example, developed plans in which less affected areas had to reserve fewer COVID-19 ICU beds. In Bulgarian districts with an incidence rate between 60 and 119.9 cases per 100,000 inhabitants, hospitals had to reserve 5% of bed capacity for COVID-19 patients, while 10% of beds had to be reserved in areas with incidence rates above 120 cases per 100,000 inhabitants as of October 2020.

As a result of the increase in ICU beds during the first wave of the pandemic, a reserve of additional beds and ICU equipment existed in many countries, which was available to create or designate beds for COVID-19 patients in subsequent waves as needs increased. This allowed for more flexible planning of hospital resources. In many countries, such as Austria, Belgium, France, Slovakia and Sweden, ICU bed capacity dedicated to COVID-19 patients increased according to the numbers of COVID-19 patients hospitalised; thus the number of ICU beds and COVID-19 ICU beds evolved depending on the pandemic waves. Austria, for example, was able to increase ICU capacity by 10–20% on average, but up to 50% where capacity was severely needed during the second wave.

The example of Denmark shows a health system’s capacity to adapt and plan throughout the pandemic. In the first wave, Danish regions were asked to reserve around half the national acute and ICU surge capacity for COVID-19 patients. In the second wave, existing ICU surge capacities were considered sufficient, but...
Box 3: Telemedical solutions in critical care were scaled up during the pandemic

Established in 2017, the project Enhanced Recovery in Intensive Care (ERIC) aimed at strengthening the adherence and use of quality indicators to avoid long-term consequences such as Post Intensive Care Syndrome (PICS) and to optimise the patient’s rehabilitation potential. This telehealth programme involved delivering structured, daily, telemedical cart-based rounds to critically ill patients as well as offering a 24/7 on-call service with Charité operating as a hub. While initially providing virtual intensive care in hospitals in the Berlin-Brandenburg area in Germany, ERIC has been scaled up rapidly within the SaveBerlin@COVID-19 network to include all Berlin hospitals that treat COVID-19 patients. Shortly after, ERIC’s telemedical robots were deployed to other parts of Germany to support hospitals in heavily affected regions. Moreover, intensive care specialists within the ERIC project continued to provide telemedical counselling to hospitals in Uzbekistan and South Africa throughout the COVID-19 pandemic.

In another example, the Cyber-Physical System for Telemedicine and Intensive Care (CPS4TIC) was successfully using telemedicine during the first wave for intensive care treatment of COVID-19 patients. CPS4TIC supports the transformation of existing as well as newly created intensive care structures to operate as a hub with a central ICU and connected ICUs in peripheral hospitals. The system comprises a telemedical cockpit as well as telemedical consoles at each connected hospital, a connector platform and bedside hubs with robotic arm altogether enabling telemedicine, continuous real-time monitoring and a bedside smart care environment. The EU-funded large-scale pilot aims at deploying eight ICU hubs across Europe and at developing a template to establish ICU hubs, which are rapidly scalable. The project brings together 19 partners from six European countries (Austria, Germany, Greece, Luxembourg, the Netherlands, Portugal) and aims at ensuring sufficient diagnosis and treatment of patients with COVID-19 while at the same time reducing the risk of infection. It was successfully implemented during the first wave of the pandemic.

The number of trained health care staff was a more limiting factor than the number of ICU beds

In many European countries, the capacity constraints in ICU wards for the care of COVID-19 patients was caused by staff shortages and insufficient skill mix rather than bed shortages. In Belgium, the Czech Republic and Germany, for example, the increase in ICU beds proved difficult to manage as there was a lack of nurses with ICU expertise and the ICU workforce already faced a high workload. In the Czech Republic, the limited availability of staff posed a substantial threat to care provision in early 2021, although this varied largely across regions. Several acute bed surge capacity was increased by 50%. Moreover, hospitals cooperated more closely during the second wave compared to the first wave.

To support countries in strengthening their skills in intensive care, the EU started an intensive care medicine training programme on basic prerequisites, together with the European Society of Intensive Care Medicine (ESICM), for doctors and nurses who do not usually work in intensive care. The rapid training, available in all EU languages, has trained about 16,000 doctors and nurses within 660 hospitals across the EU and the United Kingdom. Moreover, the EU Civil Protection Mechanism supports Member States by coordinating assistance to countries requesting EU support: in May 2021, Belgium and Denmark sent medical staff to Slovakia to help treat COVID-19 patients and in October 2021 several countries provided assistance, including medical teams and equipment, to Romania and Latvia.

Some European countries, such as Denmark or Germany, also implemented and upscaled telemedical solutions to counteract the lack of specialised staff. A European pilot network for intensive care treatment of COVID-19 patients was created during the first wave connecting 19 partners from six countries (see Box 3).

Key lesson: Work towards better communication and coordination of ICU capacities with cross-border assistance

With the rising numbers of COVID-19 cases in autumn 2021 in many EU countries, ICU wards were again facing tremendous strain in terms of staff as well as treatment capacities for other patients. In October and November 2021, Romania transferred COVID-19 patients to other countries (i.e. Austria, Hungary and Poland) and some heavily affected countries (e.g. Latvia) received assistance through the EU Civil Protection Mechanism. This solidarity mechanism which also deploys Medical Corps to countries has proved to be an important tool in providing assistance to Member States and countries with strained capacities outside the EU. Similarly, the transfer of COVID-19 patients across borders has been shown to be an important tool and symbol of European solidarity with the potential to be expanded.

Stronger coordination mechanisms at EU level as well as within border regions that allocate patients and staff across borders could be one important option. Although a transfer of COVID-19 patients requiring intensive care is clearly one of the last resorts when hospitals are at their limits of capacity, a more coordinated response in health care and providing cross-border assistance is needed. A main prerequisite for the effective monitoring of intensive care capacities and the appropriate transfer of patients and medical staff...
across borders is the close monitoring and reporting of hospital occupancy rates, which requires a harmonised definition of ICU beds; this is currently still lacking. Common regulatory mechanisms to document and recognise specialisations of health professionals, such as intensive or emergency care, or rapid training set up during the pandemic should be implemented across the EU. This would allow for better reporting on staff availability and hence more professional mobility to rapidly expand the workforce with the appropriate skills in times of urgent need.

References


Use of digital health tools in Europe: before, during and after COVID-19

By: N Fahy, GA Williams, COVID-19 Health System Response Monitor Network

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Digital health tools hold the potential to improve the efficiency, accessibility and quality of care, but widespread adoption in Europe had been slow prior to the COVID-19 crisis. Many digital health tools nevertheless moved from being viewed as a potential opportunity to becoming an immediate necessity during the pandemic, and their use increased substantially. This forthcoming policy brief takes stock of how digital health tools have been used in Europe during the COVID-19 pandemic, in order to review what has happened, assess how uptake and use of these tools has been facilitated, identify issues that are emerging, and learn lessons for the longer term to support the sustained use of digital health tools in the future.

The authors show that digital health tools have been used to support four main areas during the pandemic: communication and information, including tackling misinformation; surveillance and monitoring; the continuing provision of health care such as through remote consultations; and the rollout and monitoring of vaccination programmes. Policy changes to regulation and reimbursement, investment in technical infrastructure, and training for health professionals has been needed to facilitate utilization. The authors conclude by arguing that greater strategic investment is needed longer term to support developments in digital health, targeting both the development of infrastructure within the health setting and outside (e.g. internet provision), and research and development to ensure that technologies continue to evolve.