

COVID-19 intensive care mortality in Sweden lower than in many studies from other countries

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New research reveals that the COVID-19 intensive care (ICU) mortality rate in Sweden was lower during the first wave of the pandemic than in many studies from other countries. And while analysis of individual underlying conditions found they were linked to mortality, an analysis looking at all these variables together found COVID-19 mortality in intensive care was not associated with underlying conditions, except for chronic lung disease. This new study did, however, find that, like previous research, mortality was driven by age, severity of COVID-19 disease and the presence and extent of organ failure.

The study is published in the *European Journal of Anaesthesiology* and is by Dr. Michelle Chew, Linköping University Hospital, Linköping, Sweden, and colleagues.

"Coupled with what is widely perceived to be a 'relaxed' national pandemic strategy, results for ICU care in Sweden are understandably under scrutiny," explain the authors.

They analysed 1563 adult admissions to Swedish ICUs from 6 March-6 May, 2020 with laboratory confirmed COVID-19 disease, and complete 30-day follow up, and found 30-day all-cause [mortality](#) was 27%, while mortality actually within ICU was 23%, indicating the most patients who died after requiring ICU treatment actually died within ICU.

Various factors including age were associated with mortality. Being male raised the risk of death by 50%, while having severe respiratory failure (more advanced disease -present in three quarters of patients) trebled the risk of death. However, except for [chronic lung disease](#) (a 50% increased risk of death), the presence of comorbidities was not independently associated with mortality. Also of note that was that the degree of hypoxia (insufficient oxygen) was much higher in this Swedish cohort than those from other countries. Put another way, these Swedish patients were generally sicker upon entering ICU.

The ICU mortality of 23% in this Swedish study is between that found in two nationwide studies with small cohorts from Iceland and Denmark, at 15% and 37% respectively. It is lower than the mortality rate reported from a North American study (35%) and a French-Belgian-Swiss study (26-30%). These studies had nearly complete discharge data, meaning that most patients had survived and left ICU or sadly died there, with few patients still being treated at the time of the study.

In one report from Lombardy, Italy, ICU mortality was initially reported to be 26%; however this did not contain complete data as many patients were still being treated. A later study consisting of mostly the same patients and with almost complete ICU follow-up, mortality was 49%. These results are comparable to a recent meta-analysis of 20 studies worldwide (TM Cook and colleagues, *Anaesthesia*,

2020) that reported an ICU mortality of 42% for patients with completed ICU admissions and discharge data. Another study by Cook and colleagues, being published in *Anaesthesia* at the same time as this Swedish study (see separate press release) shows global ICU mortality up to October 2020 has since dropped further to 36%.

This new study from Sweden confirms previous findings that mortality rates are significantly higher among those aged 65 years and older. Patients over 80 years of age were seven times more likely to die than those aged 50 years and under, although the authors make clear that their data "demonstrate that provision of intensive care should not be restricted on the basis of age alone". They add: "Not all over 80 year olds die in ICU, which is one reason why we cannot exclude this group of patients from ICU care based on age alone. All decisions on care must be taken on a patient-by-patient basis".

As in other studies, a majority of patients suffered from underlying conditions (comorbidities), most commonly high blood pressure, diabetes and obesity. Whilst most comorbidities were associated with death when analysed separately, their effects were not statistically significant after adjustment for other variables. Severe obesity (BMI>40) was not associated with increased mortality as suggested by other studies. The only underlying condition that was found to have an effect in Swedish patients was chronic lung disease, which was associated with a 50% increased risk of death.

The authors discuss the various aspects of the Swedish ICU policy that could be connected with the lower ICU mortality rate. They say: "We believe that process and organisational factors have likely contributed to the relatively good outcomes seen in Swedish ICUs as staffing, protective equipment, availability of drugs, medical and technical equipment were considered at an early stage at hospital and regional levels."

In the first quarter of 2020 Sweden had 5.1 ICU beds per 100,000 population, compared to 27/100,000 in the U.S.. The COVID-19 pandemic unleashed a coordinated response in Swedish ICUs doubling the number of beds from around 500

to more than 1100 at its peak. The proportion of occupied ICU beds in the country during the study period (the peak months of the first wave of the pandemic) never reached maximum capacity. Other factors potentially connected to lower COVID-19 ICU mortality are that anaesthesiology and intensive care are combined specialities in Sweden, and this dual competency enabled rapid diversion of resources from perioperative care to intensive care management.

However, Sweden's strategy has faced harsh criticism at home and abroad for being too relaxed and dependent on individual responsibility of citizens rather than enforced lockdowns. Sweden's King also, in late 2020, publicly criticised the country's COVID-19 strategy as a failure. New laws on public transport and gatherings were enacted in autumn 2020 to limit the rising spread of SARS-CoV-2, and in late 2020, the Swedish Government passed new laws in order to be able to enforce restrictions such as venue closures to prevent cases raging out of control. Future staffing shortages, the looming possibility of burn-out and numerous organisational challenges also remain.

The authors conclude: "Mortality rates in COVID-19 patients admitted to Swedish [intensive care](#) units are generally lower than previously reported in other countries despite more severe illness on admission among Swedish patients. Mortality appears to be driven by age, baseline disease severity, and the presence and degree of organ failure, rather than pre-existing comorbidities."

Professor Chew, who is also the deputy editor-in-chief of the *European Journal of Anaesthesiology*, adds: "Although Sweden chose a different pandemic strategy to its European neighbours, its population has not been immune to rising infection rates this winter. Only time will tell if the Swedish health care system can sustain the long-term burden of COVID-19 disease."

More information: National outcomes and characteristics of patients admitted to Swedish intensive care units for COVID-19, *European Journal of Anaesthesiology*, DOI: [10.1097/EJA.0000000000001459](https://doi.org/10.1097/EJA.0000000000001459), journals.lww.com/ejanaesthesio...

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