

Outcome chart: The remaining life expectancy (indicated by contours) as predicted by short-term risk of death and age.

## Age, risk, and life expectancy in Norwegian intensive care: a registry-based modelling study

Overall, intensive care resources in Norway seem to be allocated towards patients with good expected lifetime outcomes.

The gain in life years from ICU admission seems to be comparable with gains from high-cost interventions offered in other medical fields.

The study raises the question whether the availability and rationing of ICU services are too strict in Norway.

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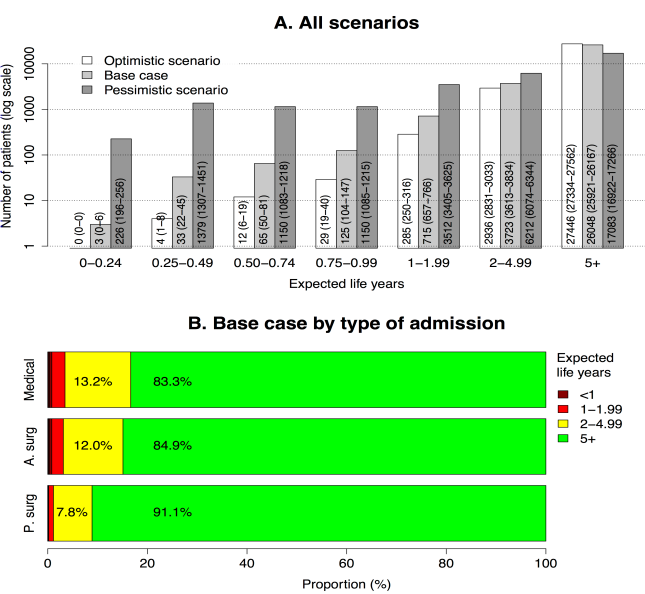
### RESEARCH GROUP

Global Health Priorities. The group works interdisciplinary within the fields of medicine, economics, ethics and philosophy, political science, public health, and epidemiology.

### Links

[journals.plos.org/plosone/article?id=10.1371/journal.pone.0125907](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0125907)

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Background:

Treatment in intensive care units (ICU) is generally considered to be expensive and capacity needs to be increased substantially over coming decades if health systems are to meet increasing demands from an aging population and shifting disease patterns. There is a worry about ICU over-treatment, especially at the end of life.

Our health systems should provide the same quality health care to patients with equal needs. Patients in the same situation, that is with equal prognosis without and with a medical treatment, should be given the same priority, within and across medical specialties. Therefore, estimates of the expected remaining lifetime of critically ill patients and the expected life years gained from ICU admission could inform decision makers setting priorities across groups of ICU patients and across medical specialties.

Applying a modelling approach with patient registry data and adjusted life tables, we estimated the expected remaining lifetime for patients admitted to ICUs during 2008–2010 in this study, and the expected gain in life years from ICU admission.

Conclusion

Despite ongoing worries about over-treatment in the ICU, our study raises the question whether the availability and priority setting of ICU services are too strict in Norway compared to services available to patients in other medical areas.

More knowledge about the effect on life expectancy of the decision to admit to the ICU compared to alternatives, and of the effect of underlying disease in ICU survivors is needed. The results must be interpreted with caution. Future work should include the resource use associated with ICU admission.

Main findings

Among all those admitted to the ICU, 19.4% died during the hospital stay. The proportion is similar to Norwegian ICU populations in previous years and in other countries.

Few patients with short life expectancies. The majority of patients had a life expectancy of more than five years upon admission (84.8% in the base case), and few had a life expectancy of less than one year (0.7%). Patients with short life expectancy were concentrated among medical admissions and admissions after acute surgery. The average expected remaining lifetime was 19.4 years.

On average, ICU admission was estimated to prolong life with at least 3 months per patient, independent of age group, compared to counterfactual general ward care.

	RR = 0.7	Base case RR = 0.8	RR = 0.9
18–44	1.93 (1.86–2.01)	1.14 (1.09–1.18)	0.51 (0.49–0.53)
45–64	1.87 (1.83–1.91)	1.11 (1.09–1.14)	0.50 (0.49–0.51)
65–74	1.34 (1.31–1.37)	0.80 (0.78–0.82)	0.36 (0.35–0.37)
75–84	0.84 (0.82–0.86)	0.50 (0.49–0.51)	0.23 (0.22–0.23)
85+	0.37 (0.36–0.38)	0.22 (0.22–0.23)	0.10 (0.10–0.10)

Average life years gained (95% confidence intervals) from ICU admission vs. hypothetical rejection and care in a general ward across different age groups. Relative risk (RR) based on observed mortality in accepted vs. rejected patients in the Eldicus II study.

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Very few of these patients were estimated to have short life expectancies. The outcomes for ICU patients appear to be better than or comparable to outcomes for patients with for example advanced cancer provided with high-cost life-extending interventions at the end of life.

In light of the practice in other medical specialties, these findings contradict the perception that we are allocating scarce and expensive intensive care resources towards too many patients with poor prognosis and marginal potential benefits.