Evaluating the Safety and Economic Impact of Reduced ICU Admissions Post-Major Cancer Surgery in the Post-COVID Era: A National Cohort Study

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INTRODUCTION

The Netherlands has fewer ICU beds (6.4 per 100,000 inhabitants) than neighbouring countries. During the COVID-19 pandemic, ICU strain led to triage and changes in postoperative care, reducing routine ICU admissions after major surgery. This study assessed the extent, safety, and economic impact of this reduction.

METHODS

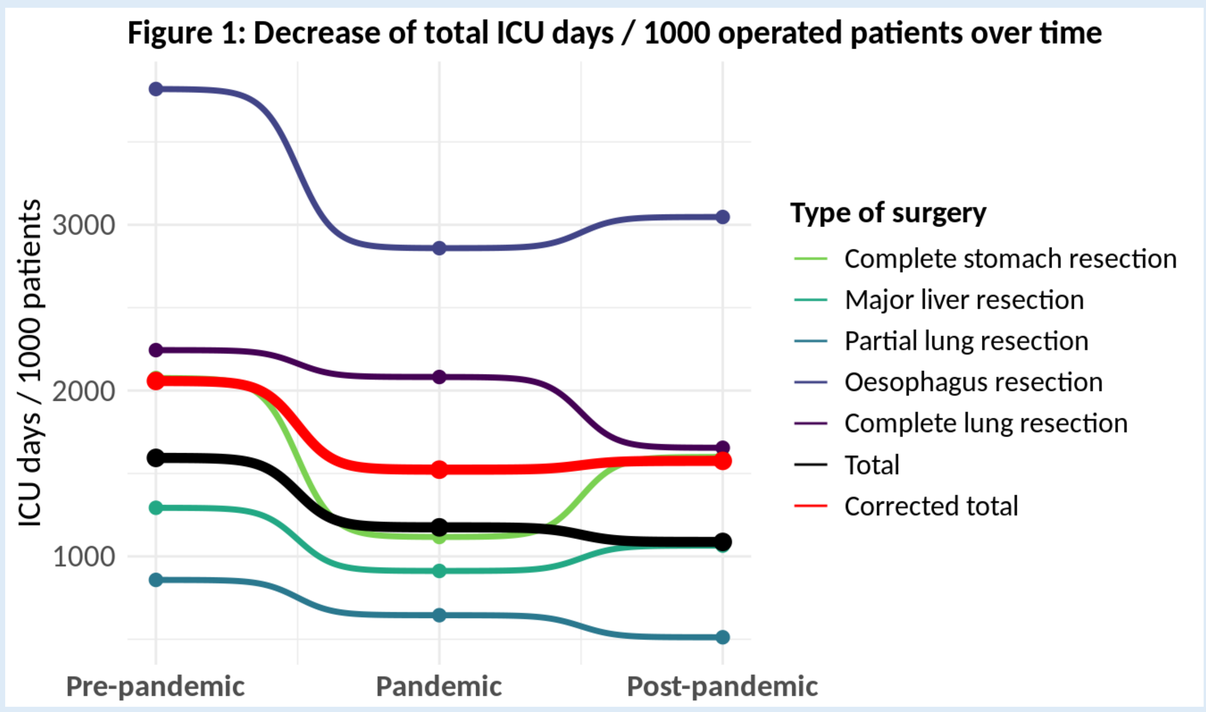
Population-based cohort study including patients undergoing major surgery between 2018 - 2022 for: lung, oesophagus, stomach, or malignant liver tumours, with ≥40% ICU admission rates pre-pandemic.

Primary outcomes: ICU days per 1000 patients and failure to rescue (complication plus mortality within 30 days or during same hospital stay). Savings in ICU costs were estimated using the national average of €2,414 per day in 2020.

RESULTS

A total of 21,476 patients were included in this study; 8,341 in the pre-pandemic, 7,207 in the pandemic, and 5,928 in the post-pandemic cohort.

Figure 1: Decrease of total ICU days / 1000 operated patients over time



For all types of procedures combined, the total number of ICU days per 1000 patients decreased

- from 1,594 days in the pre-pandemic period,
- to 1,175 (-26%) during the pandemic,
- and 1,087 (-32%) after the pandemic.

The largest reduction was after complete stomach resection (-46%), and the smallest after complete lung resection (-7%). Some procedures were performed more frequently in different periods, after adjusting for this procedure distribution, ICU days still fell by 26% during and 23% after the pandemic.

The reduction in number of ICU days can be attributed to:

- a decrease from 38% to 34% in **single day** ICU admissions (mostly routine post-operative care),
- a decrease of 21% to 13% in ICU admissions of **multiple days** (often due to complications). This could be explained partially by a decreased rate of severe complications (18% vs. 16%).

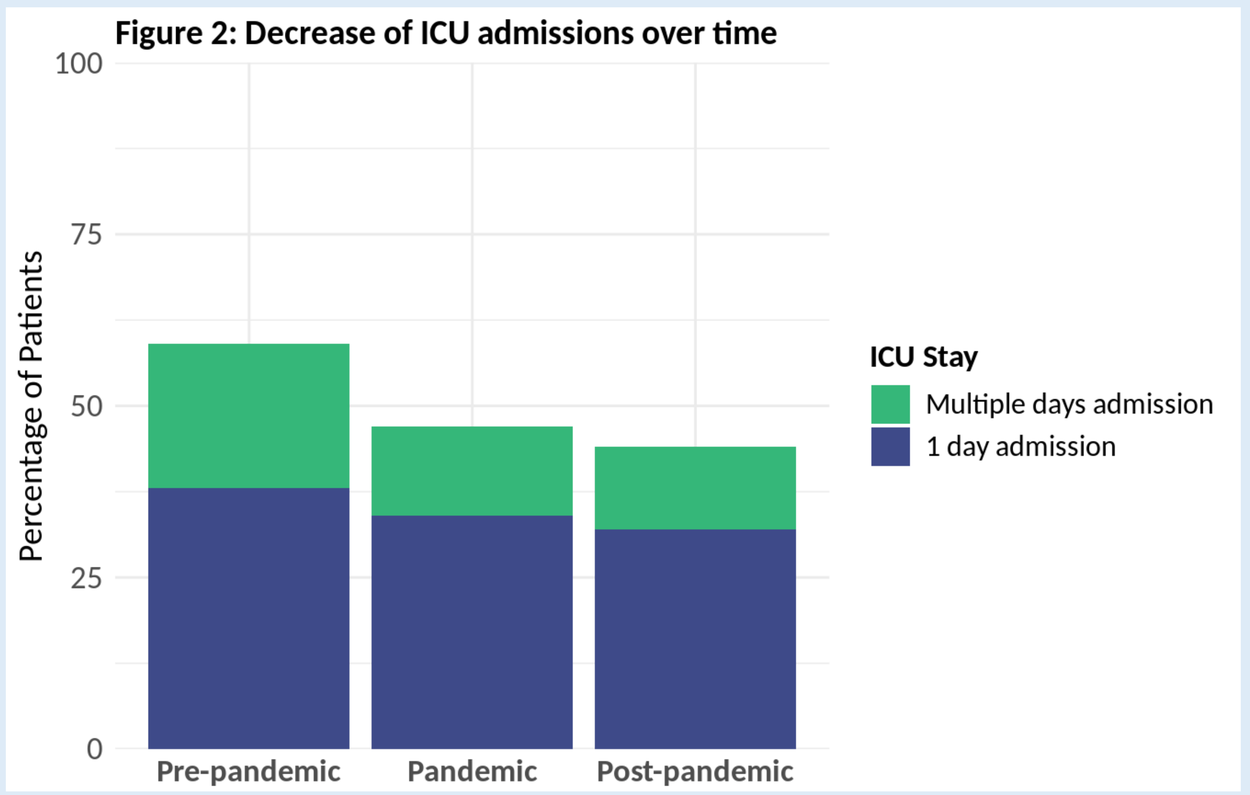
Patient Safety

Failure-to-rescue rates remained stable (2.0%, 1.9%, 1.5%; p = 0.2).

Economic impact

Estimated ICU cost savings were €1,011,466 per 1000 operated patients.

Figure 2: Decrease of ICU admissions over time



CONCLUSIONS

The COVID-19 pandemic prompted a significant and sustained reduction in ICU admissions after major cancer surgery. This shift appears safe, with no increase in failure-to-rescue rates, and may reflect reevaluation of postoperative care protocols, reduced complication rates and effective triage measures. These findings suggest that routine ICU admission following major surgery may be reconsidered, contributing to reduced healthcare costs and **value-based care**.

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