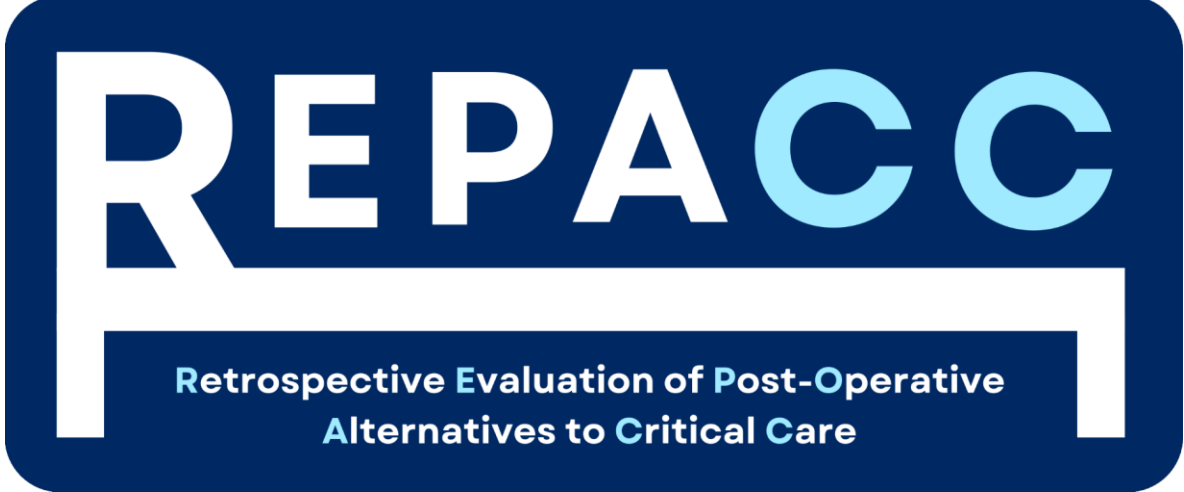



The structural and organisational impacts of perioperative enhanced care services in the UK

Christopher Oddy, Dominic Lowcock, Thomas W Davies, Sarah Towey, Mark Burnett, Amanda Davis, Gareth Davey, Adam Green, Olivia Bools, Michael Coulton, Henry Lewith, Paolo Perella, Danny J N Wong, Pan-London Perioperative Audit and Research Network Committee, The REPACC Study Investigators



Background

Enhanced perioperative care units (PACU/OIRs) have evolved to meet increasing surgical demand, aiming to relieve pressure on critical care and prevent cancellation. These units are designed for **surgical patients whose monitoring, treatment or care needs exceed what is provided on standard postoperative wards** but who do not require critical care.



Despite widespread adoption of these facilities in the UK, **currently no resources describe the national landscape** of enhanced care, the population they serve, or the organisational impacts of their introduction.

UK Critical Care Levels

ICU care (level 3)	
HDU care (level 2)	
Enhanced care (level 1)	
Ward level care (level 0)	


The ICS enhanced care guidance is available here

Key statistics

21,820 surgeries were cancelled between January and March 2025 in the UK for **non-clinical reasons**. This equates to roughly **5% of all elective surgical cases** within this period.

Odds ratio 2.92


The requirement for an **ITU bed** post-operatively increases the likelihood of an individual being cancelled by nearly **3x**



Methods

We conducted a **national, multicentre, retrospective, observational** study including... **110 sites**

Study documentation was distributed via **trainee research networks** across the country



Study Design

At each site, the **local structure of enhanced (level 1) and critical care (levels 2-3) services** was recorded alongside **time-series data** describing patient flow in these areas, and individual details for all **elective referrals to levels 1-3** between September and November 2023.

Data Sources

1 **Survey Data**

2 **Time-Series Data**

3 **Patient Data**

Patient Data

A **cluster analysis** was performed grouping similar enhanced care facilities to **visualise the landscape** of enhanced care in the UK.

Multilevel regression was used to **explore the relationships** between referral to enhanced care and various outcomes.



Analysis

Results

Enhanced Care in the UK

The level 1 units surveyed (78) had **capacity for a median of 4 patients**, cared for by **2 nurses**, and generally provided an **intermediate level of clinical care**. These facilities were frequently managed jointly between **anaesthetic and surgical directorates**. Our **cluster analysis delineated four phenotypes** of unit currently operational in the UK.

Recovery+

- Extended overnight recovery if bed not available in critical care
- No formal system of routine referral
- Nurse led vetting and allocation
- Variable clinical scope

8.5%

HDU Lite

- Provides coverage for most critical care interventions
- Functions as a critical care unit, supporting central inotropes and pressors, NIV/CPAP, and intubated patients

8.5%

Traditional PACU

- Predominantly anaesthetics led or joint with surgical teams
- Accept patients from a variety of surgical specialities
- Clinical scope limited to CPAP + peripheral vasopressors

59.3%

Specialist units

- Admission rights limited to a single speciality (e.g. vascular/orthopaedics)
- Clinical care and discharge predominantly led by surgical teams with involvement from critical care
- Limited clinical scope

23.7%

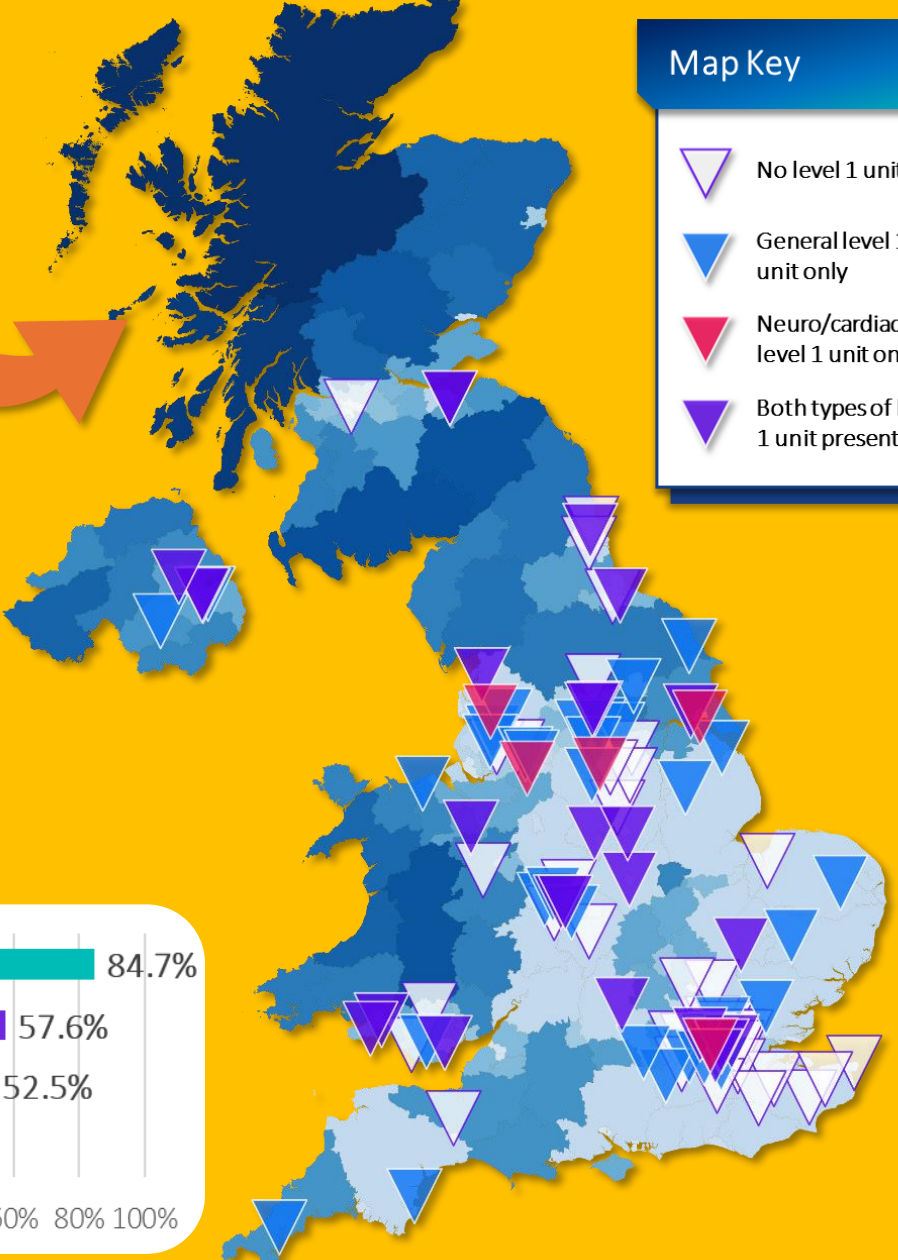
63.6% organisations had some form of surgical level 1 unit

What proportion of facilities provide additional training to nurses?

2020: **37.3%** | 2025: **94.9%**

Which factors are used to determine suitability for admission?

Clinical Judgement: 84.7%
Procedures: 57.6%
Risk Scores: 52.5%
MDT: 8.5%



Map Key:
No level 1 unit
General level 1 unit only
Neuro/cardiac/obs level 1 unit only
Both types of level 1 unit present

Enhanced Care Population Characteristics

Age	65.7 years	66.7 years
Cardiac	26.9%	32.6%
Pulmonary	22.1%	27.5%
CKD	12.5%	14.3%
Malignancy	43.6%	54.7%

Enhanced care n = 3145 | Critical care n = 2844

Of **5990** participants, **3145 (52.5%)** were referred to level 1 and **2844 (47.5%)** were referred to levels 2-3. In direct comparisons, enhanced care patients were **younger**, with **fewer comorbidities**, and were **undergoing less complex surgery**. Level 1 patients were **referred earlier** than those referred to levels 2-3, with the decision to admit **more often guided by risk stratification**.

Odds of Adverse Outcomes Amongst Enhanced Care Patients

Hospital length of stay	5 vs 7 days (p<0.001)
Cancellation	OR 0.48 [0.38-0.60]
Cancellation due to a lack of bed	OR 0.25 [0.17-0.36]
Mortality at 6 months	OR 0.59 [0.40-0.87]

Referral to level 1 was associated with a **shorter length of stay** (p<0.001) and a **reduced likelihood of cancellation** (OR 0.48 [0.38 – 0.60], p<0.001), **cancellation due to a lack of bed** (OR 0.25 [0.17 – 0.36], p<0.001), and **mortality within six-months** (OR 0.59 [0.40 – 0.87], p=0.008).

Conclusions

The UK has a mature enhanced care infrastructure, providing a **suitable alternative to critical care** for high-risk surgical patients whilst building **surgical capacity** and **system resilience**. Enhanced care facilities are associated with a **lower rate of cancellation**, a **shorter hospital length of stay**, and a **lower mortality at 6 months**; associations which may reflect both **operational efficiency** and the **lower clinical acuity** of the population they serve. Whilst these services are **associated with certain organisational benefits** it is likely that these rely upon appropriate case selection and a locally compatible service design.

Pan-London Perioperative Audit & Research Network

Midlands East Research by Critical Care & Anaesthetic Trainees

Welsh Anaesthetic & Research Network

South of England Research by Critical Care & Anaesthetic Trainees

Anaesthetic Audit and Research Matrix of Yorkshire

East of England Anaesthetic Trainee Research Network

North West Research and Audit Group

Research and Audit Partnership in Tamworth Valley and Oxford Region

West Midlands Training and Research in Anaesthesia and Intensive Care

The MPS Foundation