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National Emergency Laparotomy Audit and critical care: a novel data-collection tool to overcome barriers to critical care admission at Wirral University Hospital NHS Trust

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Our Trust has consistently failed to meet the National Emergency Laparotomy Audit (NELA) standards for critical care admission of high-risk patients. Although there has been an improvement in critical care admissions of our highest-risk patients, for those with a mortality risk > 5% it has remained stagnant at 65%, well below the national average of 79% [1]. We know that a lower threshold for admission to critical care can result in improved outcomes [2], but despite promotion of best practice guidelines, our performance remained unchanged. Dialogue between consultants from critical care and anaesthesia revealed different perceived reasons for this. We developed a customised NELA data-collection tool to highlight any possible barriers.

Methods

Following a pilot audit utilising year 6 data, we contacted NELA and designed a novel input screen embedded within the web form for our Trust. The form was designed to ascertain whether a referral was made and, if rejected, it was due to a critical care capacity issue. In the instance where a bed was not available, we prompted the anaesthetist to consider other forms of monitoring, such as a prolonged recovery room stay or critical care outreach reviews.

Results

Real-time NELA data entry in our Trust is good at > 90% case ascertainment. Our initial pilot audit showed that critical care admission for patients with a risk > 5% had improved to 75%. Reasons why the remaining high patients were not admitted were provided in 87% of cases. Analysis revealed that high-risk patients were not admitted to critical care due to a lack of referral by anaesthetists rather than a capacity issue. Following continued emphasis of best practice guidelines, performance from March to June 2019 showed mean admission rates of 85%.

Discussion

We noted a stark difference between local and national performance for critical care admission. Surprisingly, failure to refer was cited more commonly than lack of critical care beds, resulting in missed opportunities. Acknowledgement of this key finding and acting on it has ensured a greater proportion of high-risk patients being admitted to critical care postoperatively. The changes have allowed us to fall in line with the national average, increasing our admission rate by 10%. Data pertaining to a lack of capacity are also being utilised locally to help address resource allocation.

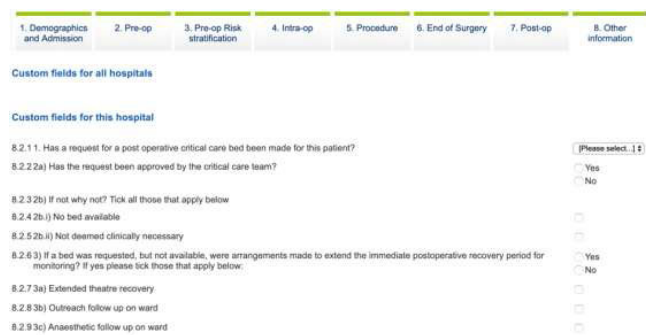


Figure 1 Our customised data input screen with specific questions pertaining to critical care referrals and admissions.

References

1. The NELA Project Team. Fourth Patient NELA Report. 2018. <https://www.nela.org.uk/reports> (accessed 31/07/2019).
2. Tengberg LT, Cihoric M, Foss NB, Bay-Nielsen M, Gögenur I, Henriksen R et al. Complications after emergency laparotomy beyond the immediate postoperative period—a retrospective, observational cohort study of 1139 patients. *Anaesthesia* 2017; **72**: 309–16.

Approvals

REC	Advice not sought
R&D department	Advice not sought
Audit department	Approval obtained
Caldicott Guardian	Advice not sought
Consent	None

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Improving case ascertainment and patient outcomes through improving our local National Emergency Laparotomy Audit pathway

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Queen Elizabeth Hospital has been involved with the National Emergency Laparotomy Audit (NELA) project since data collection began in 2014. The purpose of NELA is to ensure overall standards are raised and consistently applied across hospitals with the aim of reducing both morbidity and mortality for patients undergoing emergency gastrointestinal surgery [1]. Since 2014, there has been a national trend for improving outcomes but the annual NELA report showed that locally our outcomes were below average and declining year on year. Additionally local case ascertainment was significantly below average.

Methods

A multidisciplinary NELA workforce was formed and baseline data from the NELA web tool analysed over a 6-month period. This included the number of cases where the NELA tool was commenced pre-operatively, 30-day mortality and, for high-risk cases, the presence of an anaesthetic and surgical consultant and postoperative intensive care admission. The WHO sign-in checklist was adapted for all general surgical cases to include three NELA questions: is this a NELA case? Has a risk of death been calculated? NELA web tool data entry started? All theatre staff were educated about the importance of NELA. The data for the 6-month period following the introduction of the modified checklist were then analysed. The percentage of cases where the best practice tariff was met was compared pre- and post-introduction of the modified checklist.

Results

Table 1 NELA performance for the 6-month period pre- and post-WHO checklist introduction.

	Prior to checklist	After checklist
Number of cases	77	86
Web tool commenced pre-operatively (%)	76.6	100
Pre-operative risk documented (%)	70.6	95.1
High-risk case (%)	35.1	41.2
Consultant surgeon present for high-risk case (%)	96.0	100
Consultant anaesthetist present for high-risk case (%)	96.6	97.1
Postoperative intensive care for high-risk case (%)	81.5	94.3
30-day mortality (%)	14.3	7.1
Best practice tariff met (%)	77.8	91.4

Discussion

Through staff education and introduction of three simple questions to the WHO sign-in process, a significant increase in prospective case ascertainment has been observed. This has enabled maximal application of the NELA pathway and processes and a subsequent decrease in mortality has been observed. Importantly, the rate of risk documentation increased from 66.2% to 96.5%, which has enabled provision of more accurate personalised risk explanation to the patient. Mortality rate between the two time periods is reduced, it is not possible to establish causation; however, the downwards trend is an extremely positive finding.

Acknowledgements

These changes relied on the engagement and enthusiasm of all members of the surgical, anaesthetic and intensive care teams.

Reference

1. Anderson I, Murray D. Why do we need a national emergency laparotomy audit? *The Bulletin of the Royal College of Surgeons of England* 2014; **96**: 84–5.

Approvals

REC	Advice not sought
R&D department	Advice not sought
Audit department	Approval obtained
Caldicott Guardian	Advice not sought
Consent	None

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Using local National Emergency Laparotomy Audit data to focus quality improvement in increasing intra-operative consultant presence for high-risk cases

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Since 2015, National Emergency Laparotomy Audit (NELA) reports have recommended intra-operative consultant anaesthetist and consultant surgeon presence for high-risk cases [1]. Local NELA data showed we were not achieving this. High-risk cases (estimated 30-day mortality > 5%) had a consultant anaesthetist present intra-operatively in 75% of cases, consultant surgeon in 75% cases but only 68% cases had both. A multidisciplinary group targeted this using quality-improvement (QI) methods.

#### Methods

Local data analysis from 24 November 2017 to 23 November 2018 determined the proportion of high-risk NELA cases that had a consultant surgeon and/or anaesthetist present intra-operatively. This was compared with national figures from the NELA website. Process-mapping identified key stakeholders and steps required for intra-operative consultant presence for high-risk NELA cases. Root-cause analysis established why this care standard was not always provided. NELA recommendations and local data were presented at a multidisciplinary emergency surgery meeting to which we invited key stakeholders with representation by surgery, anaesthesia, critical care and emergency department. Together we identified what actions could help. These included ensuring all surgical/anaesthetic trainees had NELA logons to facilitate mortality estimation and advice to escalate high-risk patients to consultants (achieved by emailing all trainees and including guidance in departmental induction). Performance benchmarking was used to encourage best practice: consultant surgeons and anaesthetists were emailed and informed of current local practice compared with national data and asked to help achieve 100% intra-operative consultant presence. Cases where this was not achieved were highlighted at the monthly multidisciplinary morbidity and mortality meeting.

#### Results

The focused QI strategies have led to an increase in joint consultant surgeon and anaesthetist presence in theatre for high-risk cases from 68% (2017/18) to 80% (latest quartile NELA report 1 January 2019 to 31 March 2019).

#### Discussion

This project showed simple QI techniques, such as process mapping, root cause analysis and performance benchmarking, can lead to changes in human behaviour and processes without additional cost. We will continue to monitor intra-operative consultant presence using monthly run charts and feed this back to clinicians to ensure maintained improvement.

#### Acknowledgements

The authors thank the multidisciplinary team's motivation and willingness to change practice.

#### Reference

1. NELA Project Team. *Fourth Patient Report of the National Emergency Laparotomy Audit*. London: RCoA, 2018.

#### Approvals

REC	Advice not sought
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Local quality improvement to increase the number of high-risk emergency laparotomy patients having postoperative critical care

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Postoperative mortality approaches 10% for emergency laparotomy patients. National guidance from Royal Colleges advises postoperative critical care for high-risk patients (predicted mortality  $\geq$  5%) and this is endorsed by National Emergency Laparotomy Audit (NELA). We analysed our Trust's NELA data, compared it with national data and implemented changes to improve our practice.

#### Methods

Retrospective analysis of NELA cases between December 2017 and December 2018 showed a lack of compliance with national guidance for postoperative critical care for our high/highest-risk NELA patients. Of 137 cases, 57 had predicted postoperative mortality > 5%, of which 77% had postoperative critical care. High-risk patients (predicted mortality > 10%) were more likely to be admitted to the intensive care unit (ICU; 84%, vs. 90% national average) compared with only 53% of high-risk patients (predicted mortality 5–10%). We aimed to increase the proportion of high/highest-risk patients being admitted to critical care postoperatively through focussed QI. Process mapping identified key steps and highlighted the multidisciplinary approach between surgeons, anaesthetists, critical care and site practitioners. Our local and national NELA data and national guidance for postoperative levels of care were presented at a multidisciplinary emergency surgery meeting. Talking to key stakeholders revealed the reluctance of critical care to admit non-ventilated high-risk patients due to delayed discharges due to lack of forward flow to wards. Multidisciplinary discussions led to a new pathway to facilitate NELA patients being stepped down to the recovery area within 48 h of ICU admission if their care could be met by recovery area. This is being piloted and its impact on patient outcomes and ICU duration of stay will be assessed.

#### Results

Trust NELA reports for 2019 first quarter (pre-dating new pathway) show increased postoperative critical care admission of 92% for highest-risk patients and 84% for high-risk patients.

#### Discussion

Initial Trust NELA data showed poor compliance with national recommendations for postoperative levels of care. The improvement in the first quarter of 2019 (predating new pathway) suggests raising awareness of national guidance and presentation of local data can promote change in clinician behaviour. We hope the new pathway will lead to a further increase in postoperative critical care admission for high-risk NELA patients and, ultimately, improved overall outcomes.

#### Reference

1. NELA Project Team. *Fourth Patient Report of the National Emergency Laparotomy Audit*. London: RCoA, 2018.

#### Approvals

REC	Advice not sought
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Is this National Emergency Laparotomy Audit? A National Emergency Laparotomy Audit awareness project

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Since its inception, National Emergency Laparotomy Audit (NELA) has allowed for the monitoring of patient outcomes from patients undergoing emergency bowel surgery. This has contributed to the identification of primary drivers that require improvement; however, although patient care has since been greatly enhanced [1], the quality of NELA output is dependent on adequate data collection. Having noticed a significant drop in our case ascertainment to 47% in the last quarter of year 5, this project was undertaken to investigate the causes and improve NELA engagement.

Methods

All 796 general surgical emergency cases booked in a London district general hospital in year 5 (December 2017 to November 2018) were reviewed to identify those that meet inclusion criteria for NELA. These were compared with recorded NELA cases to ascertain unreported cases. A survey was conducted of 30 surgeons and anaesthetists to determine both their confidence in recognising NELA cases and awareness of NELA inclusion/exclusion criteria.

Results

Of the 796 general surgical emergency cases in year 5, 102 were identified as meeting NELA inclusion criteria with only 60 recorded on the NELA database. The 42 cases that had been missed were predominantly emergency laparoscopic surgery and returns to theatre following bariatric surgery. All reported cases satisfied inclusion criteria. On average, clinicians rated their own confidence in recognising NELA cases as 80%; however, they scored 36% on the NELA inclusion/exclusion criteria survey.

Discussion

A significant proportion (40%) of NELA cases were not recorded last year. This may be due to either a lack of awareness of what constitutes a NELA case or a reluctance to engage in data collection. NELA inclusion/exclusion criteria can be tricky to navigate and difficult to keep up with changes. We created a summary of NELA criteria, which has been made available at staff induction and in emergency theatres. We also ran multidisciplinary NELA awareness sessions at clinical governance meetings. Demystifying NELA criteria to the entire theatre team has allowed for dialogue within the entire department. We have since found increased NELA criteria awareness amongst theatre staff and have progressively increased our data capture in the year 6 quarterly reports.

Acknowledgements

The authors thank the clinicians who complete the NELA data entry for their cases in a timely fashion and those who took part in the survey.

Reference

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Approvals

REC	Advice not sought
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Audit department	Approval obtained
Caldicott Guardian	Advice not sought
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Learning from deaths: a mortality review of emergency laparotomies at Cardiff and Vale University Health Board

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The National Emergency Laparotomy Audit (NELA) recommends that all deaths are to be examined in a structured manner. Using the principles of the 'National Mortality Case Record Review Programme' [1], we conducted a review of higher-risk laparotomy deaths, to identify areas for quality-improvement interventions.

Methods

We reviewed 20 deaths in patients deemed as higher risk (PPOSSUM > 10%) between February 2017 and February 2018. We created a mortality review template, including compliance with NELA standards and a narrative focusing on specific phases. The reviews were completed by two senior anaesthetic registrars and assessed by the NELA surgical, anaesthetic and intensive care leads.

Results

Fig. 1 shows compliance of > 70% in all standards except elderly care input. The review narratives highlighted poor sepsis management, the need for more senior input into the management of frail patients and issues with the treatment and transfer of patients with acute abdomens admitted via medicine to our non-acute surgical site.

**Table 1** NELA standards compliance in 20 patients.

NELA standard	n (%)
Accurate risk assessment	14 (70)
Computed tomography reported by consultant	15 (75)
Pre-operative intensive care unit involvement	20 (100)
Timely arrival at theatre	14 (70)
Consultant surgeon	19 (95)
Consultant anaesthetist	18 (90)
Intensive care unit admission	17 (85)
Elderly care input	1 (5)

Discussion

This review, together with NELA recommendations, led to several interventions. The emergency laparotomy pathway has been revised to include a frailty score in pre-operative risk scoring. A sepsis tool [2] and further prompts for sepsis recognition have also been added as part of a project to improve our sepsis management. We have provided multidisciplinary teaching in frailty and sepsis recognition. An emergency laparotomy simulation session is planned for foundation trainees. We have reviewed further laparotomy patients admitted via medicine with the physicians. A multiple-specialty collaboration has developed rapid surgical referral pathways for high-risk emergency laparotomy patients from the medical admissions unit and emergency department. We have secured funding for a peri-operative elderly care physician. The reviews were instrumental in focusing our improvement activity. We have achieved wider organisational engagement with NELA and hope this will be reflected in improved outcomes.

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2. Nutbeam T, Daniels R on behalf of the UK Sepsis Trust. Clinical resources. <https://sepsistrust.org/professional-resources/clinical/> (accessed 31/07/2019).

Approvals

REC	Advice not sought
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Audit department	Advice obtained: approval waived
Caldicott Guardian	Approval obtained
Consent	None