



# The Second Patient Report of the National Emergency Laparotomy Audit (NELA)

December 2014 to November 2015

July 2016

## EXECUTIVE SUMMARY



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# 1 EXECUTIVE SUMMARY

## 1 Overview

- 1.1 This is the Second Patient Audit Report of the National Emergency Laparotomy Audit (NELA). It covers patients who underwent emergency bowel surgery (emergency laparotomy) between December 2014 and November 2015. It describes the care received by these patients within English and Welsh NHS hospitals as well as hospital-level patient mortality.
- 1.2 NELA was established to describe the processes of care and outcomes of patients undergoing emergency bowel surgery in England and Wales in order to promote quality improvement. NELA was commissioned by the Healthcare Quality Improvement Partnership (HQIP) and commenced in 2012, with patient data collection from December 2013.
- 1.3 More than 30,000 patients undergo an emergency laparotomy each year in NHS hospitals within England and Wales.<sup>1,2</sup> The majority of patients undergoing emergency bowel surgery have potentially life-threatening conditions requiring prompt investigation and management. These procedures are associated with high rates of postoperative complications and death; recent studies have reported that overall 15% of patients die within one month of having an emergency laparotomy.<sup>1,3,4,5</sup>
- 1.4 The clinical pathway for patients undergoing emergency bowel surgery is complex, and requires input from clinicians from several specialties including emergency departments, acute admissions units, radiology, surgery, anaesthesia, operating theatres, critical care and elderly care. Unlike elective (planned) care, there is often limited time to investigate and prepare these patients before surgery. This creates challenges in the delivery of care on a day-to-day basis and in bringing about long-term service improvement.
- 1.5 A number of recommendations and standards have been published to safeguard and improve the quality of care received by patients undergoing emergency laparotomy (Chapter 21.4). NELA names all participating hospitals and reports their outcomes and performance against published standards of care (Chapters 17 and 21.1). This allows the best performing hospitals to be identified in order that good practice can be disseminated. It also allows hospitals to see areas in which they can bring about improvement through local quality improvement (QI) initiatives. Differences in the structure of hospitals mean that it is unlikely that generic solutions will be applicable to all circumstances. Each hospital should examine its own results to identify reasons for their current situation and develop solutions to bring about improvement.
- 1.6 The aim of this executive summary is to provide an overview of findings from the second year of patient data collection (December 2014 to November 2015), to summarise key themes and to make recommendations for commissioners, hospitals and clinicians. Detailed comparative data for individual hospitals is presented throughout the main Report.

## 2 Data quality and case ascertainment

- 2.1 Data was entered into NELA from more patients this year compared to last year (23,000 compared to 21,000). Case ascertainment increased from 65% to 70%, with data from 186 of the 191 eligible NHS hospitals in England and Wales. Data completeness has also improved.

### 3 Processes of care

3.1 The following key processes are drawn from published standards, and adherence to them 24 hours a day, seven days a week, constitutes delivery of high-quality care:

#### **Timeliness of care**

- Review by a consultant surgeon within 14 hours of admission.
- Prompt administration of antibiotics (when indicated).
- CT scans reported by a consultant radiologist before surgery.
- Access to theatres without delay.

#### **Appropriate level of care guided by assessment of risks of complications and death:**

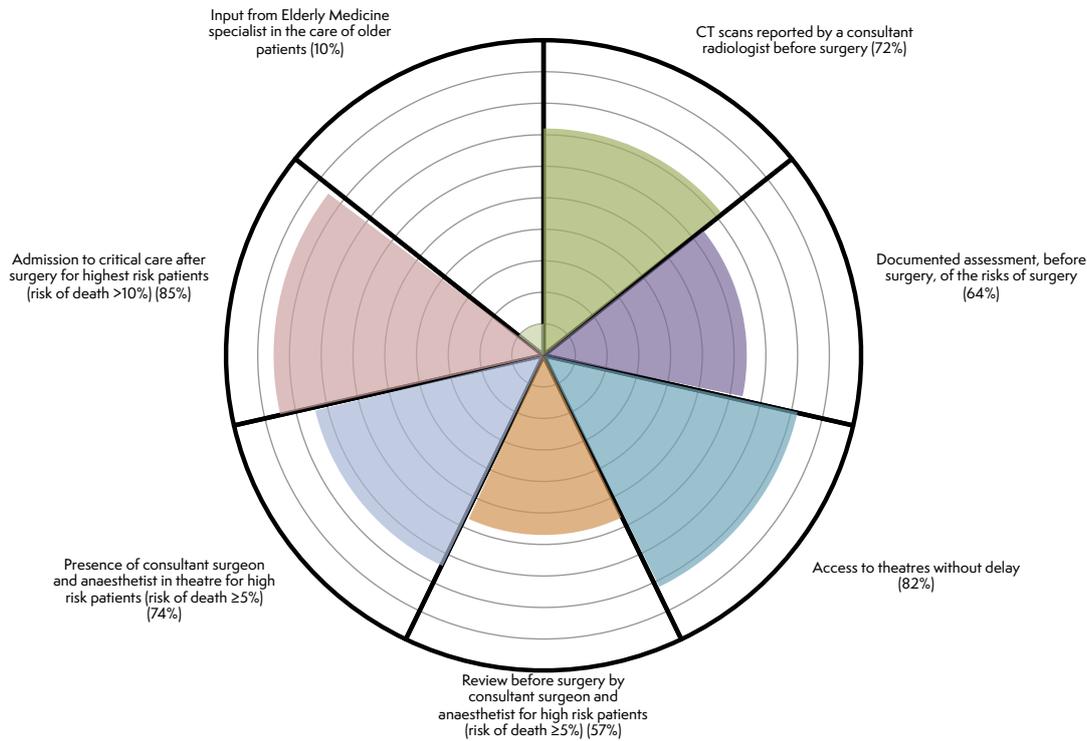
- Documented assessment, before surgery, of the risks of surgery.
- Review before surgery by consultant surgeon and anaesthetist for high-risk patients.
- Presence of consultant surgeon and anaesthetist in theatre for high-risk patients.
- Admission to critical care after surgery for high-risk patients.
- Input from Elderly Medicine specialists in the care of older patients.

3.2 The degree to which these standards were met by hospitals varied. Over 80% of patients had access to theatres without delay, but delay was more common for patients who required surgery most urgently. There has been improvement (64% compared to 56%) in the proportion of patients who had a risk assessment documented. There have been improvements in consultant delivered care, although 'out of hours' presence is still lower than 'in hours'. There has been modest improvement (85% compared to 83%) in the proportion of highest risk patients admitted directly to critical care after surgery. The proportions of all patients receiving treatment that met key standards of care are summarised in Figure 1.

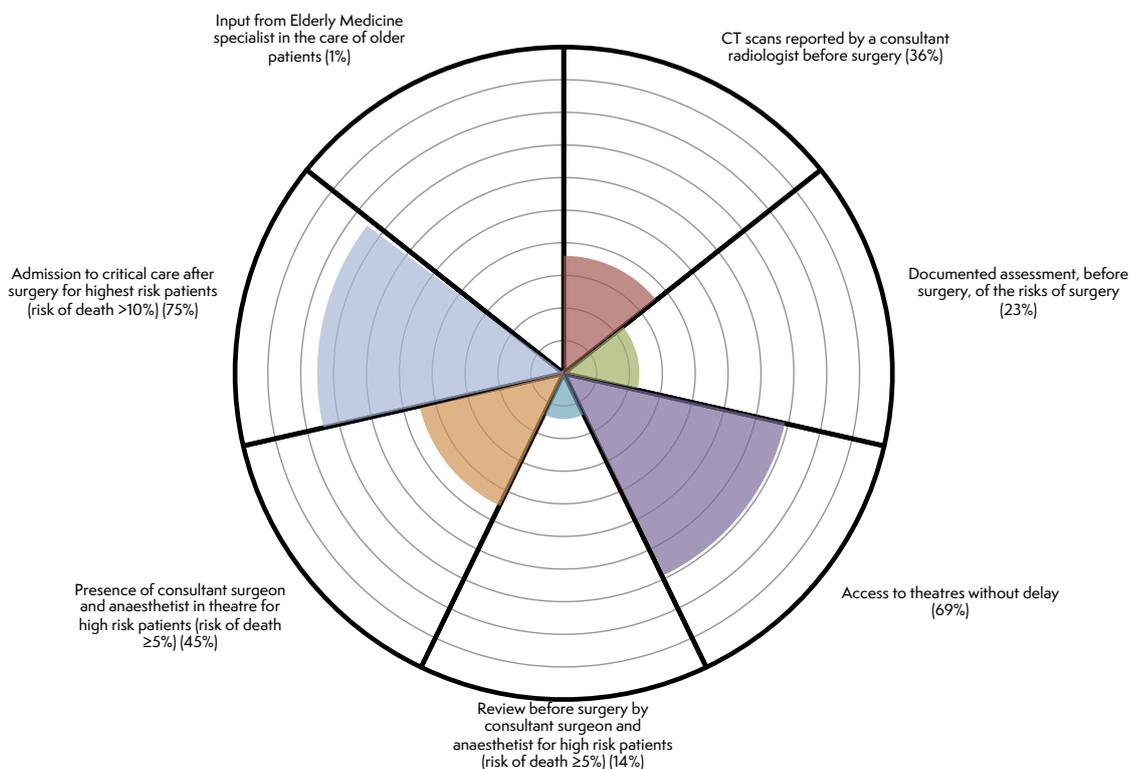
3.3 Standards of care at hospital level were reported using a RAG (Red-Amber-Green) rating. The proportions of hospitals that met these standards (rated Green, where standards were met in  $\geq 80\%$  of patients) are summarised in Figure 2. More hospitals received a Green rating this year compared to last year, particularly for reporting of CT scans, risk assessment and consultant-delivered care. Many other hospitals currently meet standards of care for 60–70% of patients and are close to achieving a Green rating. This is expanded upon throughout the Report.

3.4 The Summary Table (Table 1) shows the key standards of care with their respective process measures, results for Year 1 and Year 2 of the Audit Report, with information on how this has changed over time, and an indication of hospital-level performance.

**Figure 1 Proportion of *all patients* in Year 2 (who had surgery between December 2014 and November 2015) meeting the required standard**



**Figure 2 Proportion of *hospitals* in Year 2 rated 'Green' for each process measure ('Green' equates to the standard being met for at least 80% of patients)**



## 4 Patient outcomes

### 4.1 Postoperative mortality

The proportion of patients that died within 30 days of surgery (observed 30-day mortality) was 11.7% in Year 1 and 11.1% in Year 2. This confirms the high-risk nature of emergency bowel surgery. These figures are based on linking patients in the NELA database with independently verified mortality data from the Office for National Statistics (ONS). There was variation in risk-adjusted 30-day mortality between hospitals ranging from around 5% to 17%. No hospitals fell outside the range used to identify 'outliers' with unexpectedly high mortality rates.

### 4.2 Length of hospital stay

More than half of patients who survived to leave hospital were in hospital for less than 11 days after surgery, but more than a quarter remained in hospital 20 days after surgery. Older patients were more likely to remain in hospital longer after surgery. Indicative figures based on government costings suggest that the cost of ward care alone for these patients is in excess of £200 million annually.<sup>a</sup> However there has been an improvement in average length of stay of almost two days, from 18.1 days in Year 1, to 16.3 days in Year 2. This represents an annual cost saving of over £22 million.

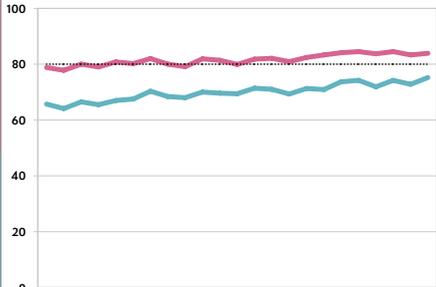
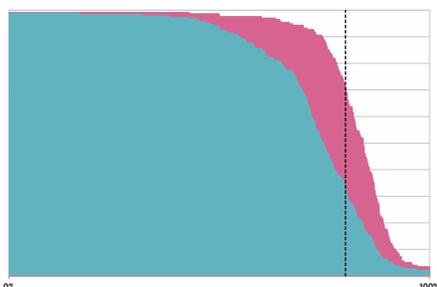
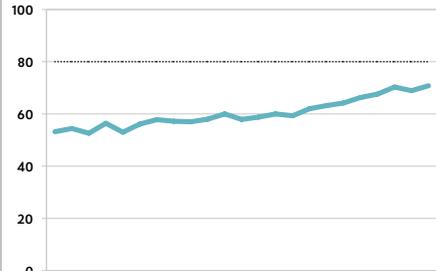
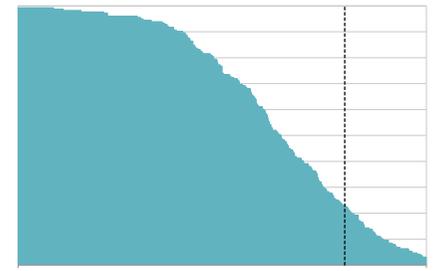
## 5 Key themes and the path to improvement

- 5.1 Compared to the First NELA Patient Report, improved clinician engagement has resulted in a greater number of patients being entered into NELA.
- 5.2 Improvements in processes of care have been seen since the First NELA Patient Report. More patients now receive a preoperative assessment of their risk of complications and death, and consultant presence during surgery has increased. Perioperative care is now largely consultant-driven, a substantial change from historical norms. However, there remain differences in consultant presence depending on the time of the day, or the day of the week, that surgery is undertaken.
- 5.3 This year's results again confirm the importance of preoperative risk assessment. Where risks had been documented, patients were more likely to receive subsequent levels of care that met standards.
- 5.4 More hospitals are consistently delivering very high levels of service: around 30 more hospitals were rated Green for key metrics compared to last year. This demonstrates that it is possible to improve the care of emergency surgical patients within the NHS.
- 5.5 In general, improvement has taken place in areas that require change at the level of individual clinician and team behaviours (e.g. risk assessment and consultant presence). Clinicians should be commended for this, and encouraged to continue this improvement across other areas.
- 5.6 There has been little improvement across indicators that require change at an organisational level (e.g. access to theatres, critical care, and input from Elderly Medicine specialists). Rectifying this will require greater engagement between clinicians, managers and commissioners.
- 5.7 Inter-hospital variation in the provision of important elements of care is substantial. In many hospitals, provision of care (such as consultant presence and critical care admission) falls short of that provided for patients undergoing major elective surgery of comparable or lesser risk.
- 5.8 Older people continue to be the group that are at the highest risk, the longest length of stay and the highest mortality. Despite this we have not seen an improvement in collaborative working, with Elderly Medicine specialists being involved in fewer than 10% of older patients undergoing emergency laparotomy.
- 5.9 As continued effort is made to improve care, we expect to see a reduction in mortality. Many of the observed improvements in standards began during the current audit period. It is likely that any impact occurred too late to be reflected in this year's mortality figures.

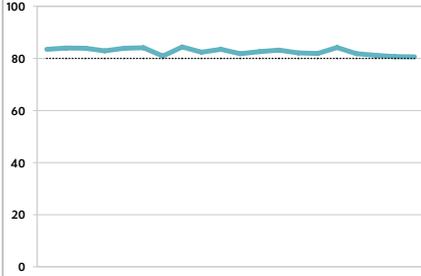
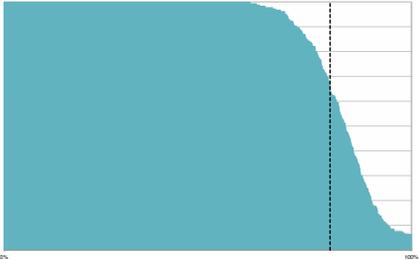
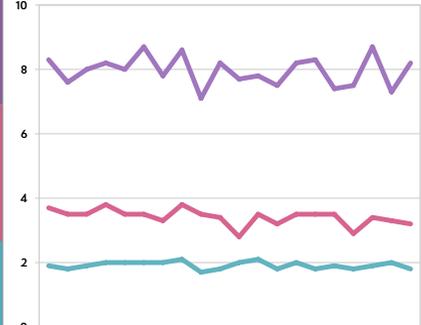
<sup>a</sup>Based on the cost of a hospital stay being estimated at £400/day (<https://data.gov.uk/data-request/nhs-hospital-stay>).

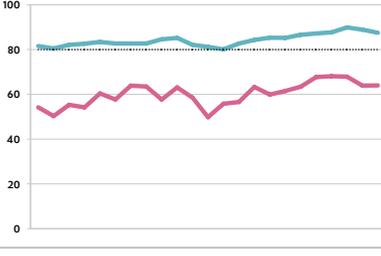
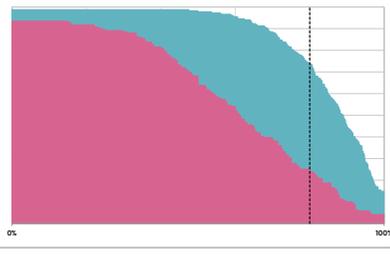
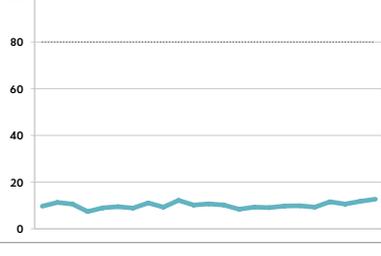
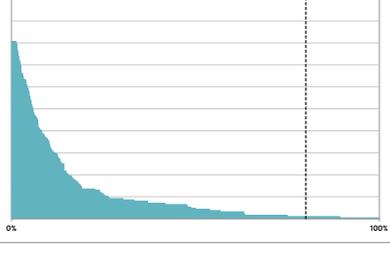
- 5.10 As standards of care improve, we would also expect to see a reduction in the length of stay for many patients. The reduction in length of stay seen in Year 2 represents a saving to the NHS of over £22 million. Investing in resources to bring about improvement and deliver high-quality care is therefore likely to be cost effective.
- 5.11 Examples of good practice have been collated within this Report and on the NELA website so that hospitals can adapt them for their own use. Several hospitals have made their pathways available to NELA. These are provided on the NELA website: [www.nela.org.uk/pathway-examples](http://www.nela.org.uk/pathway-examples).

**Table 1 Summary of standards, process measures, First and Second NELA Patient Reports performance, performance over time and hospital level performance**

Key standard	Process measure	First NELA Patient Report	Second NELA Patient Report	Trend over time Vertical axis =% of all patients receiving this standard of care Horizontal axis = time since start of Audit	Hospital-level performance (Year 2 data) Vertical axis: each horizontal line represents a hospital. 0% axis: proportion of patients in each hospital that received this standard of care. Dashed line: target for acceptable care
All emergency admissions must be seen and have a thorough clinical assessment by a suitable consultant as soon as possible but at the latest within 14 hours from the time of arrival at hospital.	Proportion of patients who were reviewed within 14 hours of hospital admission by a consultant surgeon	54%	55%		Hospital level performance not reported
Hospitals which admit patients as emergencies must have access to both conventional radiology and CT scanning 24 hours per day, with immediate reporting.	Proportion of patients who received a CT scan before surgery	81%	83%		
	Proportion of patients who received a CT scan which was reported by a consultant radiologist before surgery	68%	72%		
We recommend that objective risk assessment become a mandatory part of the preoperative checklist to be discussed between surgeon and anaesthetist for all patients. This must be more detailed than simply noting the ASA score.	Proportion of patients in whom a risk assessment was documented preoperatively	56%	64%		

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Each higher risk case (predicted mortality $\geq 5\%$ ) should have the active input of consultant surgeon and consultant anaesthetist.	Proportion of patients with preoperative P-POSSUM risk of death $\geq 5\%$ who were reviewed by a consultant surgeon, a consultant anaesthetist, and both consultants, before surgery	Preoperative review by a consultant surgeon	71%	71%		
		Preoperative review by a consultant anaesthetist	80%	77%		
		Preoperative review by both consultants	59%	57%		
	Proportion of patients with preoperative P-POSSUM risk of death $\geq 5\%$ for whom a consultant surgeon, a consultant anaesthetist, and both consultants, were present in theatre	Consultant surgeon present in theatre	87%	89%		
		Consultant anaesthetist present in theatre	78%	82%		
		Both consultants present in theatre	70%	74%		

Key standard	Process measure	First NELA Patient Report	Second NELA Patient Report	Trend over time Vertical axis =% of all patients receiving this standard of care Horizontal axis = time since start of Audit	Hospital-level performance (Year 2 data) Vertical axis: each horizontal line represents a hospital. 0% axis: proportion of patients in each hospital that received this standard of care. Dashed line: target for acceptable care	
Trusts should ensure emergency theatre access matches need and ensure prioritisation of access is given to emergency surgical patients ahead of elective patients whenever necessary as significant delays are common and affect outcomes.	Proportion of patients arriving in theatre within a time appropriate for the urgency of surgery	84%	82%			
Providers are expected to screen for sepsis all those patients for whom sepsis screening is appropriate, and to rapidly initiate intravenous antibiotics, within 1 hour of presentation, for those patients who have suspected severe sepsis, Red Flag Sepsis or septic shock  Trusts should ensure emergency theatre access matches need and ensure prioritisation of access is given to emergency surgical patients ahead of elective patients whenever necessary as significant delays are common and affect outcomes.	Timeliness of care for patients undergoing emergency surgery for suspected peritonitis (median time in hours (IQR))	Time from admission to arrival in theatre (hrs)	8.1 (5.0-13.3)	7.7 (4.8-12.8)		Hospital level performance not reported
		Time from admission to first dose of antibiotics (hrs)	3.6 (1.8-7.0)	3.3 (1.4-6.6)		
		Time from decision to operate to arrival in theatre (hrs)	2.0 (1.3-3.5)	1.9 (1.1-3.0)		

Key standard	Process measure	First NELA Patient Report	Second NELA Patient Report	Trend over time Vertical axis = % of all patients receiving this standard of care Horizontal axis = time since start of Audit	Hospital-level performance (Year 2 data) Vertical axis: each horizontal line represents a hospital. 0% axis: proportion of patients in each hospital that received this standard of care. Dashed line: target for acceptable care	
Note: due to limited evidence base, there are no relevant standards against which this process measure is reported.	Proportion of patients receiving goal directed fluid therapy	52%	54%		Hospital level performance not reported	
All high risk patients should be considered for critical care and as a minimum, patients with an estimated risk of death of >10% should be admitted to a critical care location.	Proportion of patients who were directly admitted to critical care postoperatively	Highest risk patients (postoperative P-POSSUM risk of death >10%)	83%	85%		
		High risk patients (postoperative P-POSSUM risk of death 5-10%)	58%	62%		
Comorbidity, disability and frailty need to be clearly recognised as independent markers of risk in the elderly. This requires skill and multidisciplinary input, including early involvement of Medicine for the Care of Older People.	Proportion of patients aged 70 years or over who were assessed by an Elderly Medicine specialist	10%	10%			

## 3 RECOMMENDATIONS

### Using the Audit's findings to improve care

#### Process measures

Process measures are sensitive indicators of performance, and serve to highlight where specific actions are required to bring about improvements in care. Many hospitals currently meet standards of care for 60–70% of patients and are close to achieving a 'Green' rating. Clinicians, hospital managers and commissioners should examine their results. They should determine why standards are met for some of their patients, but not others, and seek to achieve more consistent delivery of high-quality care. They should monitor measures over time to assess the impact of any changes.

#### Mortality and other outcomes

Clinicians, hospital managers and commissioners also need to examine their hospital's 30-day mortality and length of stay figures. The variation between hospitals in these measures suggests that there is room for improvement in many hospitals, especially where standards of care are not being reliably met. Whilst no hospitals were statistical 'outliers' for 30-day postoperative mortality, several had figures approaching a level that causes concern ('alert' status) – Commissioners, Chief Executives Medical and Clinical Directors, and Multidisciplinary Teams of such hospitals should make particular efforts to address any shortfalls in standards of care (Chapter 17.1).

The following 12 recommendations are aimed at addressing the key themes identified in this NELA Patient Report. Specific recommendations are highlighted in the relevant chapters.

Improvements since last year have predominantly been seen in areas involving a change in individual clinicians' and teams' behaviour. This needs to continue, but a more sustained effort is required to bring about the organisational change necessary to prioritise emergency care.

### Commissioners

- 1 Commissioners should review the Audit results for hospitals from which they commission services, to assure themselves of the quality of care provided to patients undergoing emergency laparotomy. Where hospitals fall short of standards, or where mortality is of concern, **commissioners should ensure that there is adequate commissioning of:**
  - **Multidisciplinary input** across the whole of the patient pathway (Chapters 8, 9, 13, 15 and 16).
  - **Capacity to deliver consultant-delivered care** and other services, such as **CT scanning** and reporting regardless of the time of the day or the day of the week (Chapters 8, 9 and 13).
  - **Theatre capacity** to prevent delays for patients requiring emergency bowel surgery. Some hospitals may require the capacity for emergency and elective care to continue in parallel (Chapter 12).
  - **Critical care capacity** to match high-risk caseload, such that all high-risk emergency laparotomy patients can be cared for on a critical care unit after surgery (Chapter 15).
  - **Elderly Medicine services** to provide input for older patients (Chapter 16).

### Providers (Chief Executives and Medical Directors)

In order to deliver high-quality care to high-risk emergency patients that meets standards, attention should be directed at organisational change in the following areas:

- 2 Patients undergoing emergency bowel surgery require **consultant involvement in their care** 24 hours per day, seven days per week. Rotas, job plans and staffing levels for surgeons and anaesthetists should reflect this. The workload may require an increase in the number of consultants available for emergency work. In some hospitals, this may require separation of elective and emergency care so that both services can continue in parallel without competing for resources. Delivery of high-quality care can be facilitated by reconfiguring services to locate acute surgical patients within a single area. (Chapters 8 and 13).

- 3 Policies should be developed and implemented which use **individual risk assessment to guide allocation of resources** (e.g. critical care) appropriate to the patient's needs (Chapters 10, 15 and 17). This can also help with capacity planning by defining a hospital's expected caseload and resource requirements.
- 4 Provision of **emergency theatre capacity** needs to be sufficient to enable patients to receive emergency surgical treatment without undue delay, and may require capacity to allow emergency and elective care to continue in parallel. Where capacity is limited, prioritisation of time-sensitive emergency surgery can be facilitated by policies to defer elective activity (Chapters 11 and 12).
- 5 National standards for **postoperative critical care admission** should be adhered to. This may require an increase in critical care capacity so that emergency and elective care can continue in parallel (Chapter 15).
- 6 Data collected from NELA has the potential to inform NHS trust boards of many different aspects of emergency care provision. Local NELA Leads and perioperative teams must have **adequate time and resources to support accurate data collection, review adverse patient outcomes**, and to feed this back to clinical teams and hospital management including NHS trust boards. Such resources include **access to individuals with audit and quality improvement skills** throughout the NHS trust, allocated (job-planned) time to support data collection and analysis, and protected time for presentation of data in departmental meetings. Effort should be invested in ensuring clinical coding is accurate (Chapters 5, 17 and 18).

### Clinical Directors and Multidisciplinary Teams

Patients undergoing emergency bowel surgery will receive care from a variety of clinical specialties, including the emergency department or acute admissions unit, radiology, surgery, anaesthesia, operating theatres, critical care and elderly care. These recommendations apply across these areas, as in many cases the need for change is not confined to a single area or specialty.

- 7 In order to reduce variation in care and minimise delays, hospitals should implement appropriate pathways for the care of emergency General Surgical patients, starting at the time of admission to hospital or referral by another team. Where pathways of care do already exist, Multidisciplinary Teams (MDT) should examine these in the light of audit data to determine their efficacy, and identify why standards are still not met. Care pathways should ensure patients are admitted under the most appropriate specialty, aid communication within the MDT, prioritise emergency resources, and aim to ensure that all processes of care are provided for each patient. Standardised pathways of care also facilitate audit and thereby highlight key areas for improvement. **Pathways should cover the following areas:**
  - Referral of patients for General Surgical review if they have been admitted under non-surgical specialties.
  - Identification of patients with signs of sepsis and prompt prescription and administration of antibiotics.
  - Identification and escalation of care of patients who would benefit from the opinion of a consultant surgeon before the next scheduled ward round.
  - Rapid request, conduct, and reporting of CT scans.
  - Routine documented assessment of the risk of complications and death from surgery.
  - Presence of consultant surgeon and consultant anaesthetist for high-risk patients with a predicted mortality  $\geq 5\%$ .
  - Admission to critical care for patients with a predicted mortality  $>10\%$ .
  - Identification of patients who would benefit from input from Elderly Medicine specialists in their perioperative care.
- 8 **Multidisciplinary Teams should hold regular joint meetings** to continuously review essential processes of care (for instance, using the NELA Quality Improvement Dashboard) and review perioperative morbidity (including unplanned returns to theatre and admissions to critical care) and mortality following emergency laparotomy. This should include formal collaboration with hospital mortality review panels in order to bring about greater understanding of where improvement is needed (Chapters 17 and 18).
- 9 **Continuous quality improvement informed by local data** should involve monitoring the impact of pathway and process changes with time-series data (run charts). The NELA web tool provides automated dashboards that can be used for this purpose. Multidisciplinary Teams should ensure that they include members with a good understanding of quality improvement principles, such as the Model for Improvement and good data feedback practices (Chapter 18).

## NELA Leads

We are grateful to NELA participants for increasing case ascertainment and ensuring that data completeness was generally good. However, at some hospitals, data entry for many cases was started but not completed. In addition, fields relating to the timing of key points in the patient pathway (e.g. time of consultant surgeon review, decision to operate) were poorly completed by many hospitals (Chapter 5). Collection and feedback of high-quality data is vital to bring about improvements in care.

- 10 NELA Leads should review their local data to **ensure case-submission and data completeness**. Where data collection and entry is a problem, NELA Leads, supported by NHS trust resources, should work with clinical teams to improve this, to facilitate future audit and quality improvement (Chapter 5).
- 11 NELA Leads should actively promote **completion of P-POSSUM data fields** to ensure that risk estimation is accurate and avoid falsely elevated risk-adjusted hospital mortality rates (Chapter 5). This is in addition to the finding that standards of care were better met where risk assessment had been carried out.

## Professional Stakeholder Organisations

- 12 Professional stakeholders, such as Royal Colleges and Specialist Societies, should collaborate to:
  - Improve clarity and remove ambiguity in the wording of standards of care. This would be particularly welcome for standards for admission to critical care (Chapter 15).
  - Bring together standards in a single, unified document.
  - Highlight the issues to their members to ensure appropriate engagement.

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