# Addendum to the Eighth Patient Report of the National Emergency Laparotomy Audit

December 2020 to November 2021

**January 2024**

Royal College of Anaesthetists | NIAA HSRC Health Services Research Centre | Royal College of Surgeons of England Advancing Surgical Care | HQIP Healthcare Quality Improvement Partnership

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## 1.1 Case ascertainment

### Key Findings:

■ Of 178 hospitals in England and Wales, 172 (96.6%) contributed data to this metric (see Technical Appendix). The six hospitals that did not contribute data to this metric were all English, had at least 10 cases identified via data from NHS England, and did not submit cases to NELA. Overall case ascertainment was 74.3% (Table 1.1). As suggested in Year 7 (NELA, 2021), the fall in case ascertainment in Year 8 is again thought to be at least partially attributable to the pandemic. Beginning in NELA Year 10 (1st April 2023), case ascertainment will form part of our outlier policy, whereby sites rated 'red', i.e., less than 55% case ascertainment, will be considered as outliers.

**Table 1.1 Case ascertainment**

| | Total number of patients included in audit (%) | Number of hospitals contributing data | Number[1] of patients included in case ascertainment (%) | Case ascertainment rate[2] (Year 7) | Case ascertainment rate[3] (Year 8) |
|---|---|---|---|---|---|
| **England** | 20,594 (93.1%) | 160 | 20,571 (93.0%) | 78.0% | 73.7% |
| **Wales** | 1,538 (6.9%) | 12 | 1,538 (7.0%) | 88.7% | 82.9% |
| **Overall** | **22,132** | **172** | **22,109** | **78.8%** | **74.3%** |

*Note: No case ascertainment data could be obtained for one hospital situated on the Isle of Man.*

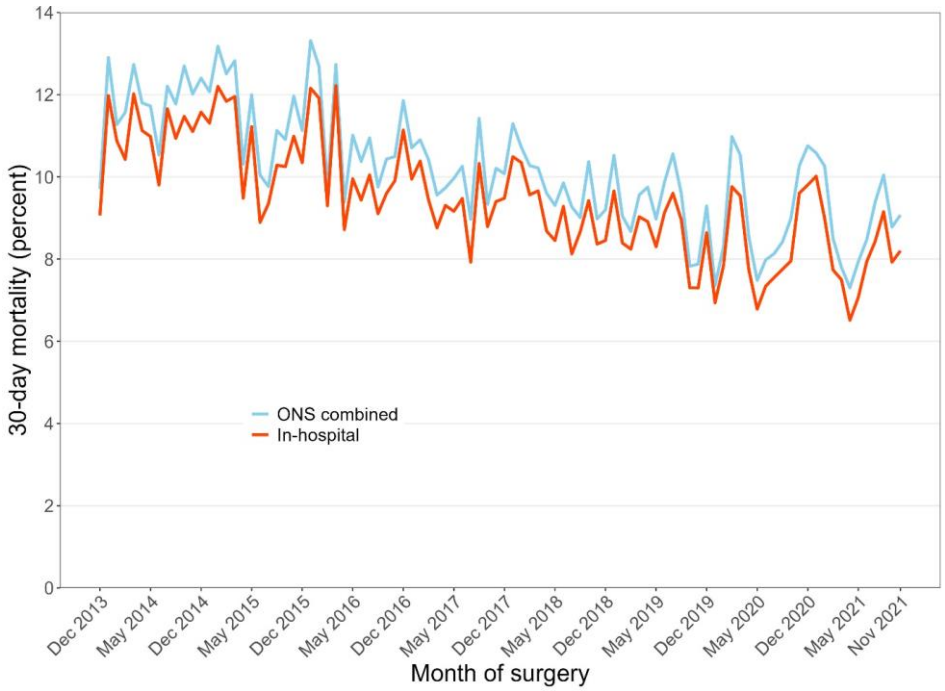
**Total number of hospitals included in Year 8 report across England and Wales = 172**

[1] Patients from hospitals where Hospital Episode Statistics (HES)/Patient Episode Database for Wales (PEDW) estimates are uncertain were excluded from this analysis.
[2] Based on HES and PEDW estimated caseloads between December 2019 and November 2020.
[3] Based on HES and PEDW estimated caseloads between December 2020 and November 2021.

## 2.1 Mortality

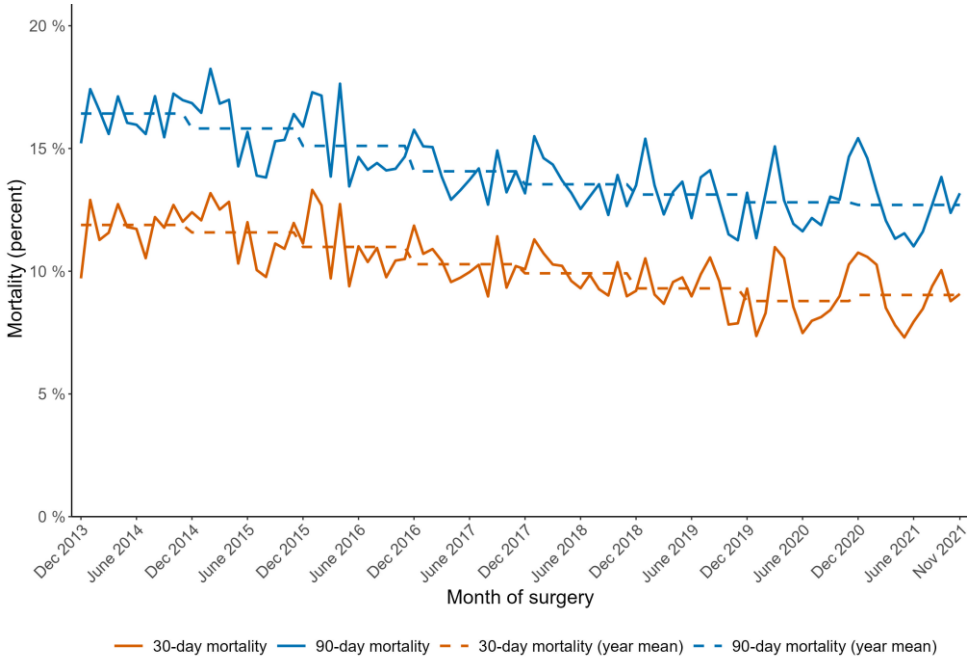
Overall, in Year 8 the 30-day mortality was 9.0% and 90-day mortality was 12.7%. Figure 2.1.1 shows unadjusted trends in 30-day mortality since the audit's inception in 2013, comparing rates based on death registrations (Office for National Statistics) with in-hospital reported mortality. Figure 2.1.2 shows unadjusted trends in both 30-day and 90-day mortality since 2013.

**Figure 2.1.1 Monthly rates of 30-day mortality after emergency laparotomy recorded in NELA**




*Note: "ONS combined" means mortality estimate based on both death registrations and hospital reports. "In-hospital": mortality estimates based on hospital reports only.*

**Figure 2.1.2 Trend (unadjusted) in the overall 30-day and 90-day ONS mortality rates, Dec 2013 – Nov 2021**



As seen in Table 2.1.1, there had been an initial decrease in mortality between NELA Year 1 and 4, but this has levelled off more recently.

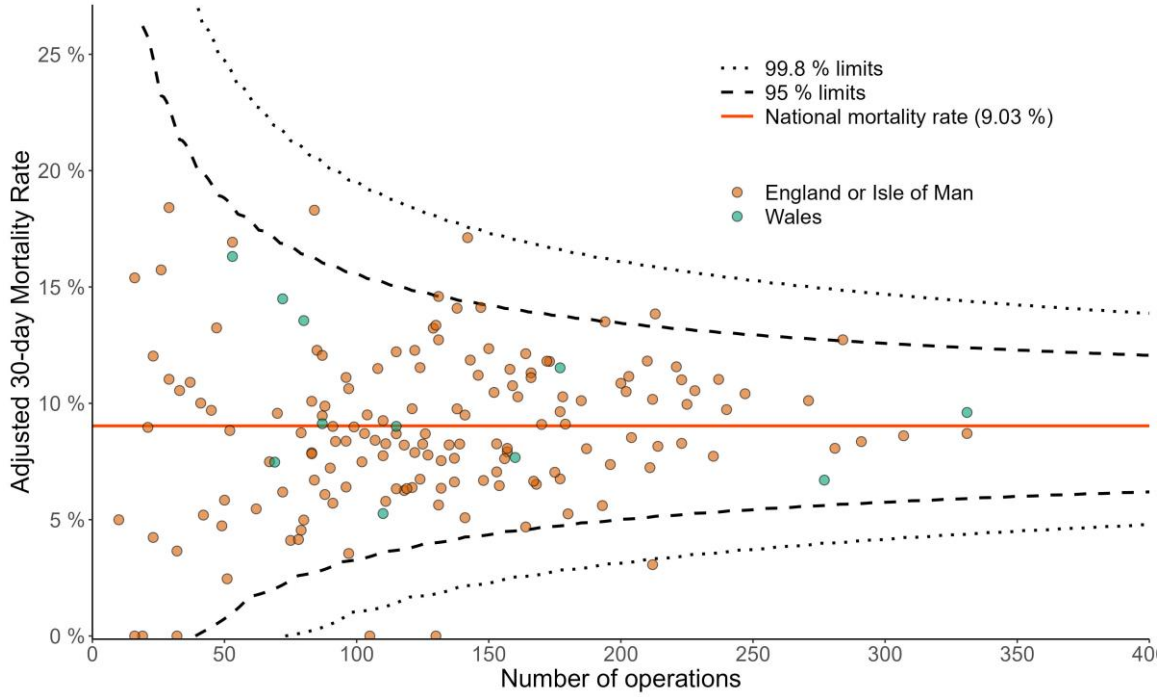
**Table 2.1.1 Annual national 30-day mortality**

| | NELA Year 1 (Dec 2013 – Nov 2014) | NELA Year 2 (Dec 2014 – Nov 2015) | NELA Year 3 (Dec 2015 – Nov 2016) | NELA Year 4 (Dec 2016 – Nov 2017) | NELA Year 5 (Dec 2017 – Nov 2018) | NELA Year 6 (Dec 2018 – Nov 2019) | NELA Year 7 (Dec 2019 – Nov 2020) | NELA Year 8 (Dec 2020 – Nov 2021) |
|---|---|---|---|---|---|---|---|---|
| Annual mortality rate | 11.7% | 11.1% | 10.6% | 9.5% | 9.6% | 9.3% | 8.7% | 9.0% |

In NELA annual reports prior to Year 7, risk adjustment of mortality for each hospital was based on risk factors contained in the NELA risk prediction model (Eugene, 2018). In this report, as in Year 7, risk adjustment has additionally taken into account the presence or absence of confirmed SARS-Cov-2 infection in the patient undergoing the operation.

The funnel plot for outlier identification was based on 166 hospitals in England, Wales, and the Isle of Man who submitted data on at least 10 operations. Seven hospitals with fewer than 10 reported operations were excluded from the funnel plot and outlier identification analyses. The funnel plot using hospitals' risk-adjusted mortality rates is shown in Figure 2.1.3. As a sensitivity analysis, we also conducted the same analysis adjusting for the risk factors contained in the NELA risk prediction model only, and not the SARS-Cov-2 infection status of the patient (details not shown). The results did not differ appreciably for any hospital.

**Figure 2.1.3 Funnel plot of risk-adjusted mortality by number of operations (NELA risk model plus adjustment for patient COVID-19 status)**




## Hospital level mortality

The NELA outlier policy defines three different categories of potential outliers based on mortality:

- Alert-level: hospitals with a risk-adjusted mortality rate above the 95% control limit
- Alarm-level: hospitals with a risk-adjusted mortality rate above the 99.8% control limit
- Double-alert level: hospitals flagged as alert for the current year, and also an alert or alarm in either of the previous two consecutive reporting cycles

Hospitals that trigger alarm- or double-alert status are required to undergo formal review of performance. In NELA Year 8, of the 166 hospitals included in the outlier identification analysis (funnel plot), four hospitals triggered alert status and none triggered alarm status. One hospital was flagged as a potential double-alert-level outlier and was requested to undertake a review of their data. Upon review, this hospital's risk-adjusted mortality dropped to below the 95% control limit and thus did not meet the criteria to be named as an outlier in this report. All hospitals that triggered alerts have been notified in advance of publication of this report and in accordance with NELA's outlier policy. Individual hospital outcomes are shown via the NELA website.

**Hospitals with the best outcomes**

Hospitals with a case ascertainment greater than 90% and with risk-adjusted mortality below the 95% or 99.8% control limit are considered positive outliers. Royal United Hospital, Bath (Table 2.1.2) had a risk-adjusted mortality below the lower 99.8% control limit, indicating that this hospital has some of the best outcomes in England and Wales. Royal United Hospital was also considered a positive outlier in our Year 7 report. The hope is that collaborative learning events will provide opportunities for hospital teams to learn from one another and share how improved outcomes for patients can be sustained.

**Table 2.1.2 Hospitals with risk-adjusted mortality below the lower 99.8% control limit and case ascertainment above 90%**

| Hospital | Caseload | Risk adjusted 30-day mortality |
|---|---|---|
| Royal United Hospital | 212 | 3.07 |

## References


1. Eugene N et al. NELA collaboration. Development and internal validation of a novel risk adjustment model for adult patients undergoing emergency laparotomy surgery: the National Emergency Laparotomy Audit risk model. *Br J Anaesth* 2018; 121(4): 739-748. Doi: 10.1016/j.bja.2018.06.026.
2. NELA Project Team. Seventh Patient Report of the National Emergency Laparotomy Audit. RCoA London 2021.