NELA Standards Calculations

Published April 2019

Standard	Thresholds
CT scan reported before surgery	Green ≥85% Amber 55 – 85% Red <55%
Risk of death documented pre-operatively	Green ≥85% Amber 55 – 85% Red <55%
Arrival in theatre with a timescale appropriate to urgency	Green ≥85% Amber 55 – 85% Red <55%
Preoperative review by consultant surgeon & anaesthetist where risk of death is ≥5% – in person or discussion	Green ≥85% Amber 55 – 85% Red <55%
Preoperative review by consultant intensivist where risk of death is ≥5% – in person or discussion	Green ≥85% Amber 55 – 85% Red <55%
Consultant surgeon & anaesthetist both present in theatre when risk of death ≥5%	Green ≥85% Amber 55 – 85% Red <55%
Consultant surgeon present in theatre when risk of death ≥5%	Green ≥85% Amber 55 – 85% Red <55%
Consultant anaesthetist present in theatre when risk of death ≥5%	Green ≥85% Amber 55 – 85% Red <55%
Admission to critical care when risk of death ≥5%	Green ≥85% Amber 55 – 85% Red <55%
Admission to critical care when risk of death >10%	Green ≥85% Amber 55 – 85% Red <55%
Assessment by specialist in the care of the older person for patients aged 70 and over (Year 5)	Green ≥80% Amber 50 – 80% Red <50%
Assessment by specialist in the care of the older person for patients aged 80 and over OR aged 65 or over and frail (Year 6 onwards)	Green ≥80% Amber 50 – 80% Red <50%
Frailty Assessment by any clinician for patients aged 65 and over (Year 6 onwards)	Not RAG rated, advisory only
Unplanned returns to theatre	Not RAG rated, advisory only
Unplanned critical care admissions	Not RAG rated, advisory only
Postoperative length of stay	Not RAG rated, advisory only

NELA Standards Calculations

Published April 2019

Mandatory Questions

There are some questions within the NELA data set that must be completed for a case to be locked. Many of these will include an option to select "Unknown" as a response, this is a valid response for a case to be locked.

The NELA Annual Report only includes locked cases, therefore, missing responses to mandatory questions will not occur. During production of the Quarterly Reports, unlocked cases are included. Hence, missing responses may remain. In the document that follows, handling of these situations is documented, but do not represent the core methods for production of RAG ratings.

The NELA Project Team encourage contemporaneous completion of data as far as is practicable.

For each reported metric, the number of unknown and/or missing data fields will be reported separately.

NELA Standards Calculations

Published April 2019

Assessment of Mortality Risk

Predicted risk of mortality is used as an element of several metrics described later in this document. NELA considers the predicted mortality to be the highest of P-POSSUM / NELA Risk Model predicted mortality or clinical judgement.

A patient can be judged to have "lower" (<5%) or "high" (>5%) risk of mortality. P-POSSUM predicted mortality, the NELA risk adjustment model and clinical judgement are the tools used to make this assessment. If there is disagreement between these methods, the highest predicted risk category of the three methods is used.

In the event that variables required for P-POSSUM or the NELA Risk Model are incomplete, P-POSSUM and NELA mortality cannot be calculated, the NELA Webtool will automatically assign the patient to a "high" risk category (>5% risk of mortality).

Calculation

Clinical judgement is considered to have been used to assess risk if Q3.2/Q6.2 has "Clinical judgement" selected. This will be associated with a risk category ("low" or "high") from Q3.1/Q6.1.

The highest risk from Q3.2, Q3.23 and Q3.26 (for preoperative risk) or Q6.2, Q6.21 and Q6.26 (for postoperative risk) is taken to be the predicted risk of mortality against which some standards are judged.

Missing Data

These are mandatory questions – to lock a record there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.

Webtool Data Fields
- Preoperative:
  - (Q3.23) S03PreOpPPOSSUMPredictedMortality
  - (Q3.26) S03PreOpNelaMortalityRisk
  - (Q3.1) S03PreOpRiskOfDeath
  - (Q3.2) S03PreOpRisk_Clinical
  - (Q3.2) S03PreOpRisk_Formal
- Postoperative:
  - (Q6.1) S06PostOpRiskOfDeath
  - (Q6.2) S06PostOpRisk_Clinical
  - (Q6.2) S06PostOpRisk_Formal
  - (Q6.21) S06PostOpPPOSSUMMortality
  - (Q6.26) S06PostOpNelaMortalityRisk

NELA Standards Calculations

Published April 2019

CT scan reported before surgery

Numerator

Number of patients who had CT performed **and** reported by a consultant radiologist preoperatively.

Note: "Consultant radiologists" refers only to "In house consultant reported" and excludes "Outsourced" reporting service.

Timeline:
- This standard was updated in Year 4 for the Annual Report to include only "Consultant Radiologist".

Denominator

All NELA patients.

Missing Data & Unknown Values

- These are mandatory questions. However, the option exists for "Unknown" to be selected for both CT reporting method and whether a CT was performed.
- "Unknown" or missing preoperative CT scanning was performed are **excluded** from the numerator. However, they remain in the denominator. In practice this means that the "unknown' and missing are treated as if a preoperative CT scan did *not* occur
- "Unknown" or missing preoperative reporting status are **excluded** from the numerator, but **included** in the denominator. In practice this means that the "unknown' and missing are treated as if a preoperative report did *not* occur

Webtool Data Fields
- (Q2.7) S02PreOpCTPerformed
- (Q2.7a) S02CTReportingMethod

NELA Standards Calculations

Published April 2019

Risk of death documented pre-operatively

Numerator

Number of patients where risk of death is documented as low or high risk. (This can be by clinical judgement, formal risk scoring, surgical APGAR, physiological criteria or other.)

Denominator

Number of patients where risk of death is documented as low, high risk or with "Not Documented" selected.

Missing Data

- This is a mandatory question – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with missing risk documentation are *excluded* from the denominator [Unlocked Cases only]
- "Not Documented" is *included* in the denominator.

Webtool Data Fields

- (Q3.1) S03PreOpRiskOfDeath

NELA Standards Calculations

Published April 2019

Arrival in theatre with a timescale appropriate to urgency

Calculation
Timing is the number of hours between the **decision to operate** and **arrival in theatre**.

Numerator
Number of patients arriving in theatre in a time less than or equal to stated urgency.

Excludes patients with NCEPOD urgency "Expedited (>18 hours)".

Denominator
Number of patients with known NCEPOD urgency, divided into "Immediate (<2h)", "Urgent (2-6h)" and "Urgent (6-18h)" categories. Excludes patients with NCEPOD urgency "Expedited (>18h)".

Missing Data & Unknown Values

- Patients with missing NCEPOD urgency fields are **excluded** from numerator and denominator (mandatory question, only missing in unlocked cases).
- Patients with missing or unknown time of arrival in theatre are **included** in the denominator, but **excluded** from numerator.
- Patients with missing or unknown time of decision to operate are **included** in the denominator, but **excluded** from numerator.

Webtool Data Fields

- (Q3.22) S03NCEPODUrgency
- (Q2.2) S02Date_DecopDatetime
- (Q2.2a) S02Date_DecopDateNotKnown
- (Q2.2b) S02Date_DecopTimeNotKnown
- (Q2.2bi) S02Date_DecopTimeNotEntered
- (Q4.1) S04ArrivalInTheatreDatetime
- (Q4.1a) S04ArrivalInTheatreDateNK
- (Q4.1b) S04ArrivalInTheatreTimeNK
- (Q4.1b.i) S04ArrivalInTheatreTimeNE

NELA Standards Calculations

Published April 2019

Preoperative input by consultant surgeon & anaesthetist where risk of death is ≥5%[1]

Numerator

Number of patients with a preoperative predicted risk of death of ≥5%, reviewed by both a consultant surgeon and consultant anaesthetist *in person or by discussion.*

This is the case of both Q2.4 and Q2.8a having the following responses.
- Q2.4: 3 – "Yes, consultant reviewed patient at time of decision" or 4 – "Yes, following discussion with junior team member";
- Q2.8a: 1 – "Yes – seen by consultant anaesthetist in person" or 2 – "Yes – discussion between consultant anaesthetist & other team member (of any specialty)").

Timeline: This question was updated in Year 4 to include the type of review (in person or by discussion). Previously, this required a yes/no response.

Denominator

Number of patients with a preoperative predicted risk of death of ≥5%.

Missing Data & Unknown Values

- These are mandatory questions – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with missing input status (by one of or both consultant surgeon or anaesthetist) are *included* in denominator but *excluded* from the numerator. [Unlocked cases only]
- "Unknown" input status (0 for surgeons, 9 for anaesthetists) remain *included* in denominator. For the numerator, they are treated as though a patient had no consultant input.

Webtool Data Fields

- (Q2.4) S02DecisionMakerGrade
- (Q2.8a) S02AnaesthetistPreopInvolvement

---

[1] Risk as described in Assessment of Mortality Risk

Preoperative input by consultant intensivist where risk of death is ≥5%[2]

Numerator

Number of patients with a preoperative predicted risk of death of ≥5%, reviewed by a consultant intensivist *in person or by discussion.*

This is the case of Q2.8b having one of the following responses.

- Q2.8b: 1 – "Yes – seen by consultant intensivist in person" or 2 – "Yes – discussion between consultant intensivist & other team member (of any specialty)"

Denominator

Number of patients with a preoperative predicted risk of death of ≥5%.

Missing Data & Unknown Values

- These are mandatory questions – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with missing review status are *included* in denominator but *excluded* from numerator. [Unlocked cases only]
- "Unknown" input status (coded 9) remain *included* in denominator. For the numerator, they are treated as though a patient had no intensive care consultant input.

Webtool Data Fields

- (Q2.8b) S02IntensiveCarePreopInvolvement

---

[2] Risk as described in Assessment of Mortality Risk

Published April 2019

Consultant surgeon & anaesthetist both present in theatre when risk of death ≥5%[3]

Numerator

Number of patients with a preoperative predicted risk of death of ≥5%, having both a consultant surgeon and consultant anaesthetist present in theatre during surgery.

This is the case of both Q4.2 and Q4.3 having the following responses.
- Q4.2: 1 - "Consultant";
- Q4.3: 1 - "Consultant".

Denominator

Number of patients with a preoperative predicted risk of death of ≥5%.

Missing Data

- These are mandatory questions – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients where data on highest grade of surgeon present in theatre is missing are ***included*** in denominator but ***excluded*** from the numerator. [Unlocked cases only]
- Patients where data on highest grade of anaesthetist present in theatre is missing are ***included*** in denominator but ***excluded*** from the numerator. [Unlocked cases only]

Webtool Data Fields

- (Q4.2) S04Surg_Grade
- (Q4.3) S04Anaes_Grade

---

[3] Risk as described in Assessment of Mortality Risk

Consultant surgeon present in theatre when risk of death ≥5%[4]

Numerator

Number of patients with a preoperative predicted risk of death of ≥5%, having a consultant surgeon present in theatre during surgery.

This is the case of both Q4.2 and Q4.3 having the following responses.
- Q4.2: 1 - "Consultant"

Denominator

Number of patients with a preoperative predicted risk of death of ≥5%.

Missing Data

- These are mandatory questions – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients where data on highest grade of surgeon present in theatre is missing are ***included*** in denominator but ***excluded*** from the numerator. [Unlocked cases only]

Webtool Data Fields

- (Q4.2) S04Surg_Grade

---

[4] Risk as described in Assessment of Mortality Risk

Consultant anaesthetist present in theatre when risk of death ≥5%[5]

Numerator

Number of patients with a preoperative predicted risk of death of ≥5%, having an anaesthetist present in theatre during surgery.

This is the case of both Q4.2 and Q4.3 having the following responses.
- Q4.3: 1 - "Consultant"

Denominator

Number of patients with a preoperative predicted risk of death of ≥5%.

Missing Data

- These are mandatory questions – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
  Patients where data on highest grade of anaesthetist present in theatre is missing are *included* in denominator but *excluded* from the numerator. [Unlocked cases only]

Webtool Data Fields

- (Q4.3) S04Anaes_Grade

---

[5] Risk as described in Assessment of Mortality Risk

NELA Standards Calculations

Published April 2019

Admission to critical care when risk of death ≥5% or >10%[6]

Numerator

Patients with postoperative risk of mortality of ≥5% or >10%, who did not die in theatre and were not palliated, who were admitted to an HDU or ICU environment postoperatively. (Note, other enhanced care areas, such as post-anaesthetic care units, are *excluded*).

- Q6.24 – patients who die in theatre have option "4 – Died prior to discharge from theatre complex" selected. These are *excluded* from numerator.
- Q6.24a – patients on end of life pathways following surgery (option "1 – Yes" selected) are *excluded* from numerator.

Denominator

Patients with postoperative risk of mortality of ≥5% or >10%, who did not die in theatre and were not palliated.

- Q6.24 – patients who die in theatre have option "4 – Died prior to discharge from theatre complex" selected. These are excluded from denominator.
- Q6.24a – patients on end of life pathways following surgery (option "1 – Yes" selected) are *excluded* from denominator.
-

Missing Data

- Postoperative care destination is a mandatory question – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with missing palliation status (Q6.24a, S06PostOpEndOfLifePathway) are assumed not to have been palliated, therefore are *included* in the analysis (remaining in both numerator and denominator).
- Patients with missing postoperative care destinations (i.e. critical care, ward, etc) remain *included* in the denominator. [Unlocked cases only]

Webtool Data Fields

- (Q6.24) S06Proc_Dest
- (Q6.24a) S06PostOpEndOfLifePathway

---

[6] Risk as described in Assessment of Mortality Risk

NELA Standards Calculations

Published April 2019

Assessment by specialist in the care of the older person for patients aged 80 and over OR aged 65 or over and are scored as being frail (Clinical Frailty Score >5) (Year 6 Methodology)

As of NELA Year 6: Patients aged 80 years and over are now included in this standard. Review can be at any time in the perioperative period. Previously, this requirement was for those aged 70 years and over have a postoperative review, see next page.

Numerator

Patients aged 80 years and older plus patients over 65 years who were scored as frail, who had a perioperative review by a care of the older person specialist.

Denominator

Patients aged 80 years and older plus patients over 65 years old who were scored as frail. *Excludes* patients who died in theatre (but *includes* patients placed on an end of life care pathway).

Missing Data & Unknown Values

- Review by a specialist in elderly care medicine is a mandatory question – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with missing data remain *included* in the denominator (if aged ≥80 years). [Unlocked cases only]
- Patients with "Unknown" are assumed not to have had a review and remain *included* in the denominator but *excluded* from the numerator.

Webtool Data Fields

- (Q1.4a) S01AgeOnArrival
- (Q2.12) S02ElderlyMedicineSpecialist
- (S7.3) S07Geriatric_Postop
- (Q2.12) S02FrailtyScore

NELA Standards Calculations

Published April 2019

Assessment by specialist in the care of the older person for patients aged 70 and over (Year 5 Methodology)

Patients aged 70 years and over are included in this standard

Numerator
Patients aged 70 years and older, who had a postoperative review by a care of the older person specialist.

Denominator
Patients aged 70 years and older. **Excludes** patients who died in theatre (but **includes** patients placed on an end of life care pathway).

Missing Data & Unknown Values

- Review by a specialist in elderly care medicine is a mandatory question – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with missing data remain **included** in the denominator (if aged ≥70 years). [Unlocked cases only]
- Patients with "Unknown" are assumed not to have had a review and remain **included** in the denominator but **excluded** from the numerator.

Webtool Data Fields

- (Q1.4a) S01AgeOnArrival
- (S7.3) S07Geriatric_Postop

Frailty assessment of the older person for patients aged 65 and over (Year 6 Methodology)

Numerator
Patients aged 65 years and older, who had a preoperative frailty assessment.

Denominator
All patients aged 65 years and older. *Excludes* patients with missing Frailty Score.

Missing Data & Unknown Values

- Clinical Frailty Score is a mandatory question – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with missing data are *excluded* from the numerator and denominator (if aged ≥65 years). [Unlocked cases only]
- Patients with "Unknown" are assumed not to have had a frailty assessment and remain *included* in the denominator but *excluded* from the numerator.

Webtool Data Fields

- (Q1.4a) S01AgeOnArrival
- (Q2.12) S02FrailtyScore

Unplanned Return to Theatre

Numerator

All patients reported as having had an unplanned return to theatre (1 – "Unplanned" or 3 – "Unplanned AND planned").

Denominator

All patients in the NELA cohort.

Missing Data & Unknown Values

- Unplanned return to theatre is a mandatory question – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with "unknown" return to theatre responses are *excluded* from both numerator and denominator. These will be reported separately.
- Patients with missing data remain *included* in the denominator. [Unlocked cases only]

Webtool Data Fields

- (Q7.4) S07Comp_Theatre

Unplanned Critical Care Admission

Numerator

All patients reported as having had an unplanned admission to critical care from the ward within 7 days of surgery.

Denominator

All patients in the NELA cohort.

Missing Data & Unknown Values

- Unplanned admission to critical care is a mandatory question – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Patients with "unknown" unplanned admission to critical care responses are **excluded** from both numerator and denominator. These will be reported separately.
- Patients with missing data remain **included** in the denominator. [Unlocked cases only]

Webtool Data Fields

(Q7.4) S07Comp_Level

Published April 2019

Postoperative Length of Stay

Calculation

Time interval (in whole days) between surgery and discharge for patients discharged from hospital alive (Q7.7: 1 – "Alive" or 60 – "Still in hospital after 60 days").

Missing Data

- These are mandatory questions – to lock a record for the annual report there must be an associated value. This might not be the case for unlocked cases used in the quarterly reports.
- Cases with missing values in any field are *excluded* from the numerator and denominator. [Unlocked cases only]

Webtool Data Fields

- (Q4.1) S04ArrivalInTheatreDatetime
- (Q7.8) S07Date_DischDate
- (Q7.7) S07Status_Disch