How predictive is NELA in Victoria and Australia?

VPCC Emergency Laparotomy Workshop

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Disclosures

- 2nd Year Master of Surgical Research Candidate
- Deakin University
- Supervisor – A/Prof Douglas Stupart

NELA

- NELA score estimates 30-day mortality risk
- Recommended changes to care pathways
- Reduction in 30-day mortality
  - 11.8%[1] → 8.7%[2]

1. The First Patient Report of the National Emergency Laparotomy Audit (2015)
2. Seventh Patient Report of the National Emergency Laparotomy Audit (2021)

Could the NELA score be missing the mark?...

- NELA score able to distinguish high from low-risk[1,2,3]
- Unknown calibration for Australian patients
- Important implications:
  - Informed consent
  - Allocation of hospital resources

1. Eliezer, Journal of Surgical Research (2020)
2. Barazanchi, Journal of Trauma and Acute Care Surgery (2020)
3. Sharrock, World Journal of Surgery (2017)

Aim

To determine whether the NELA score is well calibrated to the population of emergency laparotomy patients in Australia

Study I
University Hospital Geelong

Method

- Single-centre retrospective cohort study
- Emergency laparotomies at UHG
- July 2017 to January 2021
- Inclusion criteria defined by ANZELA

Data Collection

Geelong Emergency Laparotomy Audit (GELA) Database:

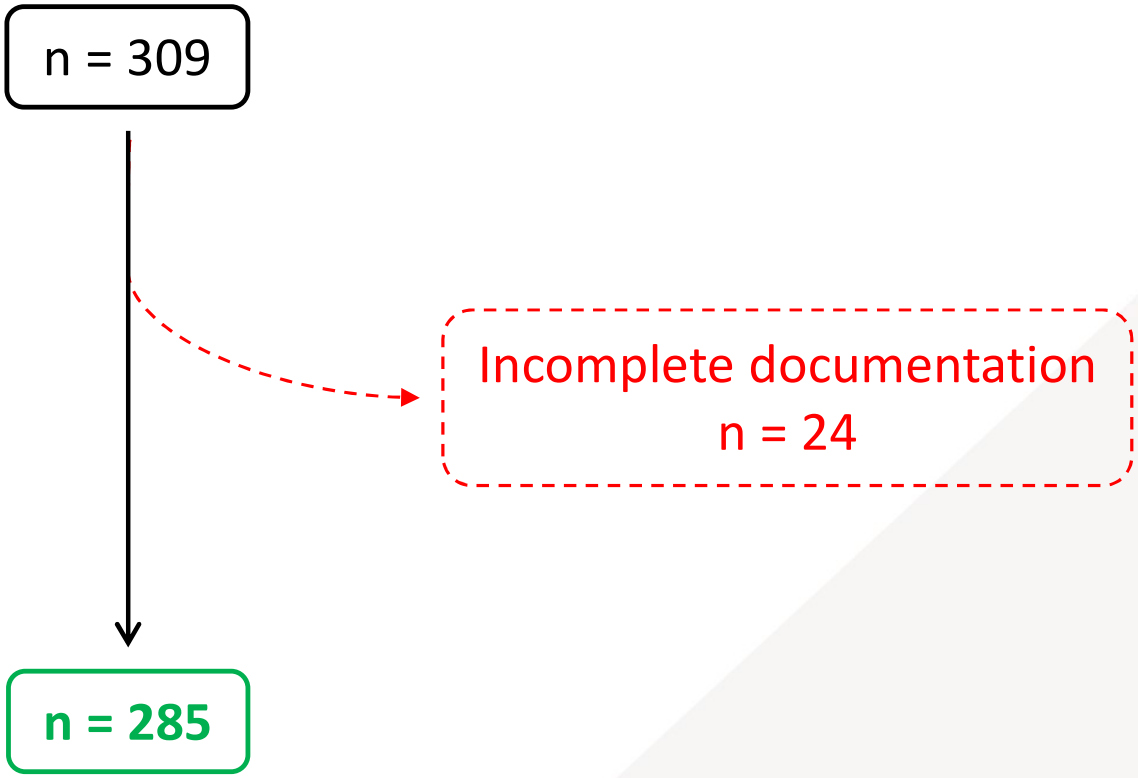
- Demographics
- NELA scores
- Outcomes (Alive v Dead)

Standardisation

- Risk-stratification of cohort
- Indirect method of standardisation
- Standardised Mortality Rate (SMR)

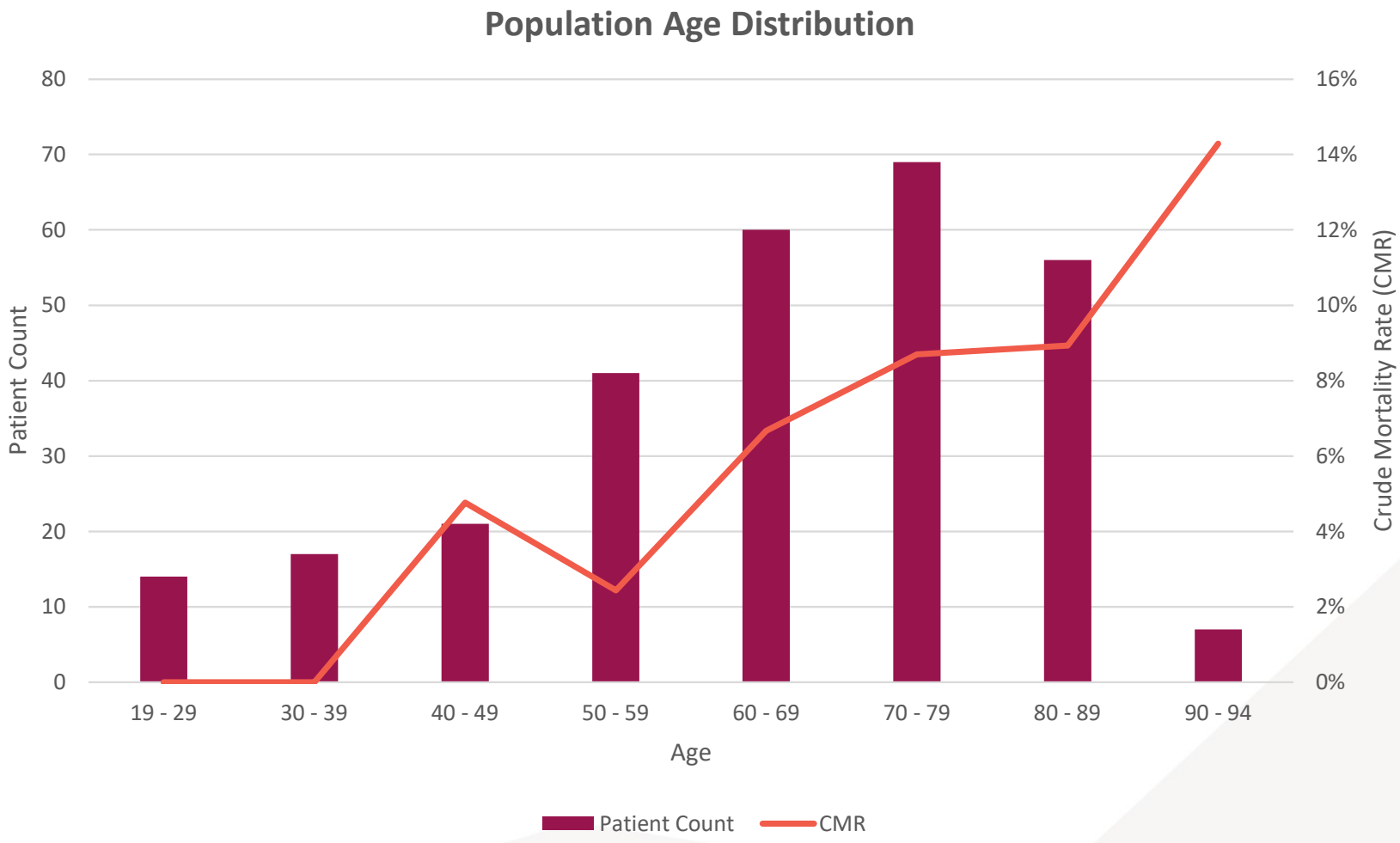
$$Standardised\ Mortality\ Rate = \frac{Observed\ Deaths}{Expected\ Deaths} \times 100$$

Results



Cohort

- 125 Males & 160 Females
- Mean age = 64 years
- Median age = 67 years

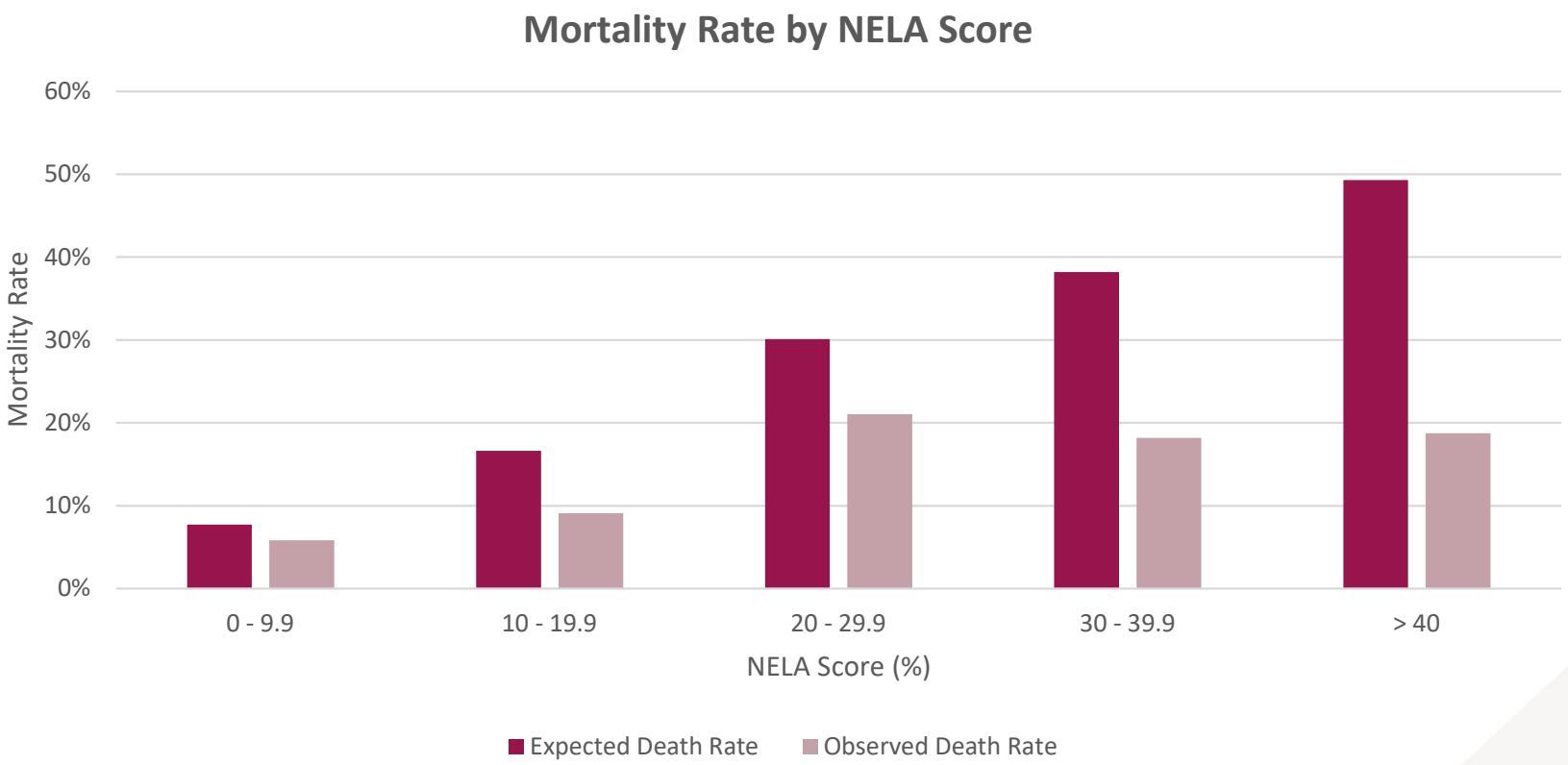

Population Age Distribution
Patient Count
Crude Mortality Rate (CMR)
80
70
60
50
40
30
20
10
0
16%
14%
12%
10%
8%
6%
4%
2%
0%
19 - 29
30 - 39
40 - 49
50 - 59
60 - 69
70 - 79
80 - 89
90 - 94
Age
Patient Count
CMR

Postoperative Destination

ICU/HDU	164	58%
Ward	66	23%
Intraoperative Death	1	<1%
Not Documented	54	19%

30-Day Mortality

Alive	267	94%
Dead	18	6%



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Median NELA Score

Dead v Alive = 20% [range 3.7% to 44.3%] v 6.4% [range 0.10% to 85%] (p <0.001)

SMR

18 observed deaths / 32 expected deaths (**57%** [95% CI 35% to 90%])

Conclusion

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Mortality after emergency laparotomy at UHG was significantly lower than the rate predicted by NELA

Study II
ANZELA

Method

- Multi-site retrospective cohort study
- Emergency laparotomies at 26 ANZELA institutions
- June 2018 to August 2021
- Inclusion criteria defined by ANZELA

Data Collection

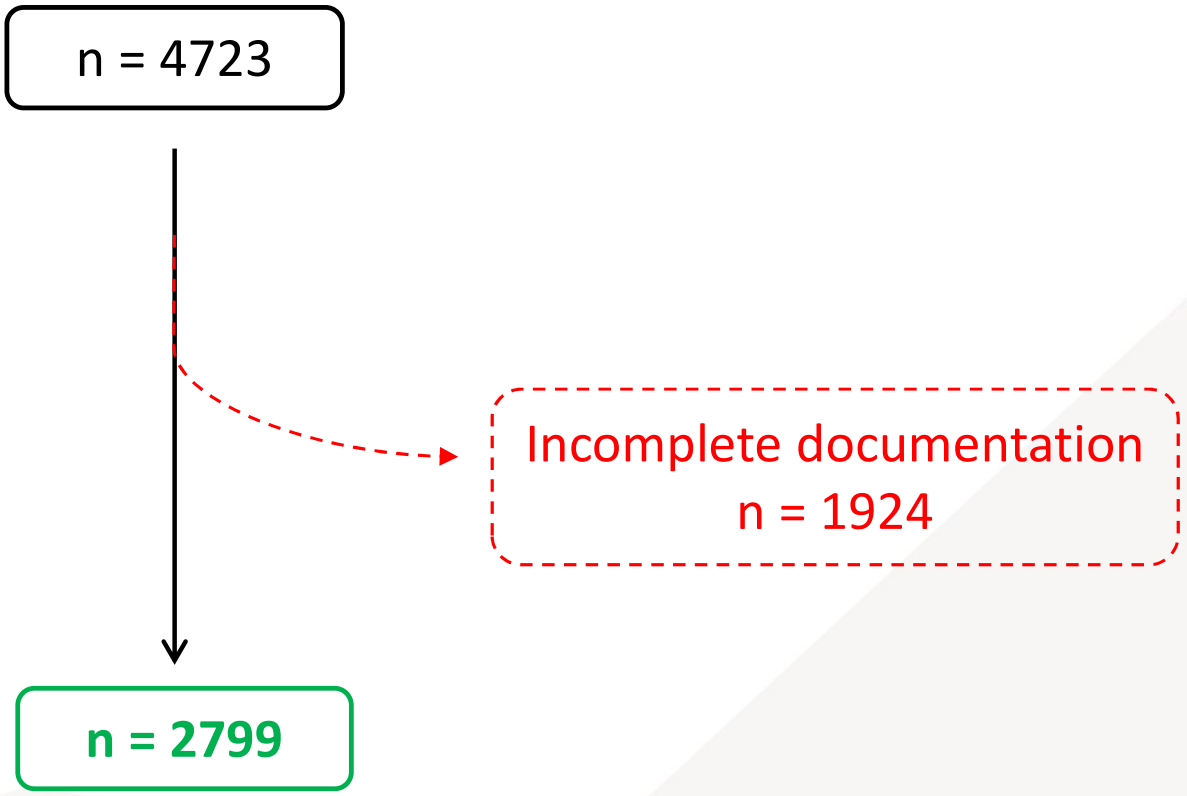
ANZELA Database

- Demographics
- NELA scores
- Outcomes (Alive v Dead)

Standardisation

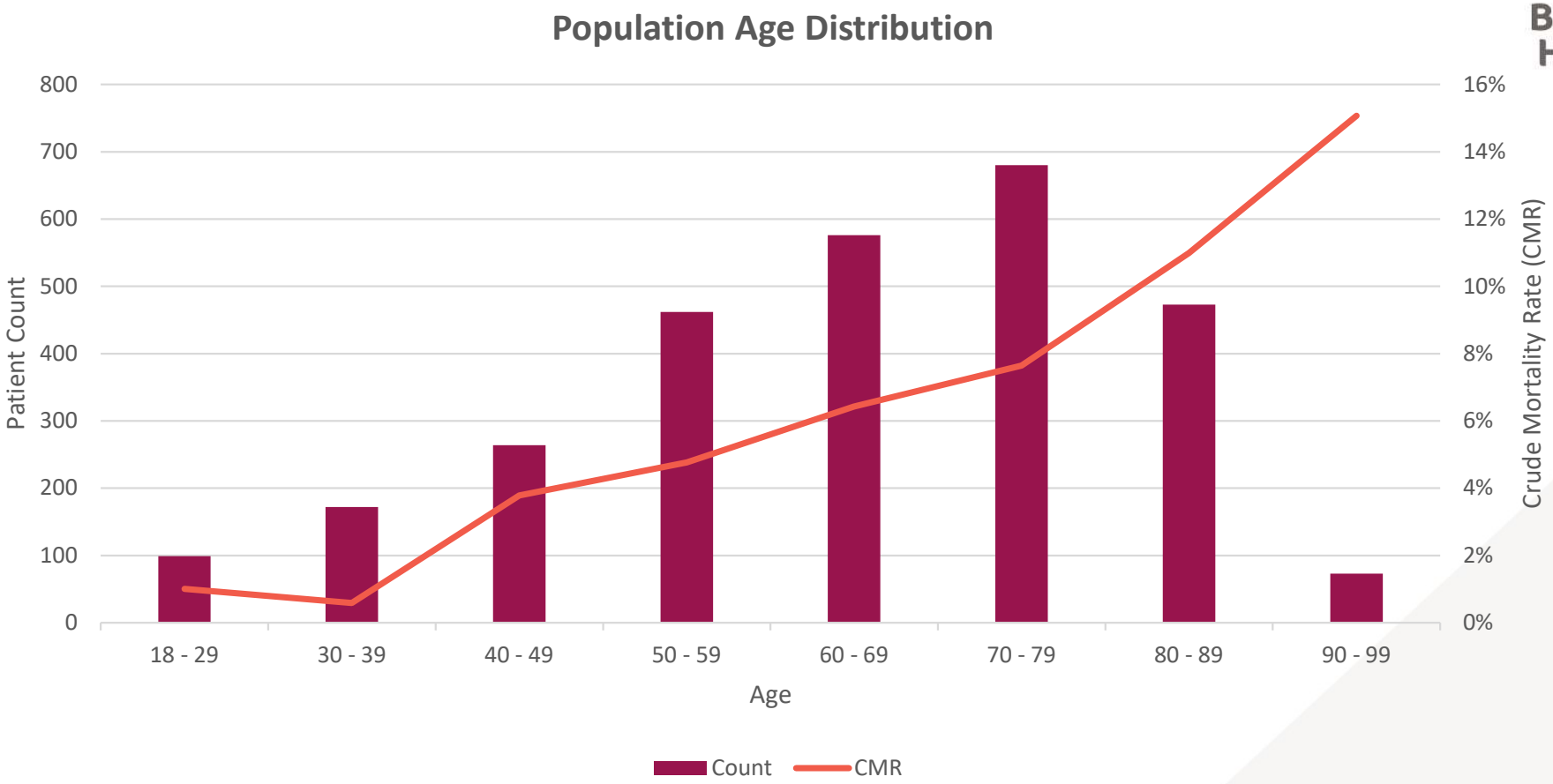
- Risk-stratification of cohort
- Indirect method of standardisation
- Standardised Mortality Rate (SMR)

Results



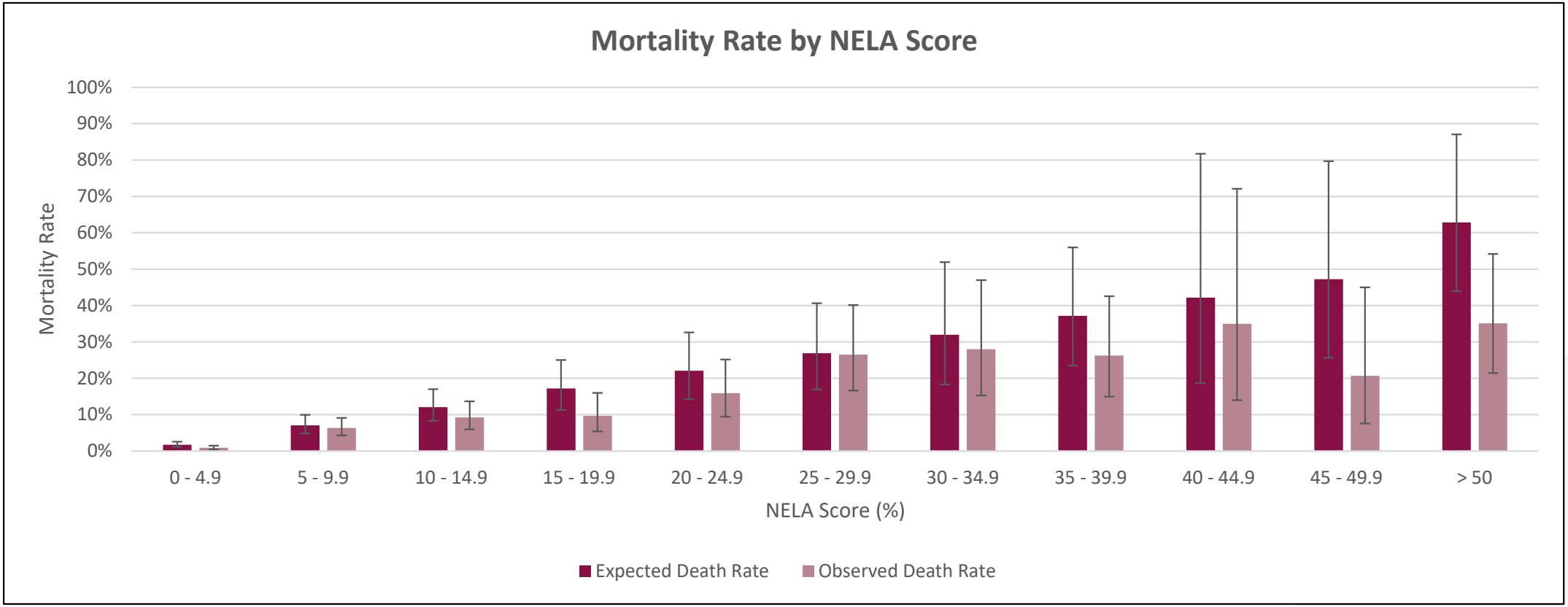
Cohort

- 1386 Males & 1407 Females
  - Sex not documented in 6 cases
- Mean age = 64 years
- Median age = 67 years


Population Age Distribution
Patient Count
Crude Mortality Rate (CMR)
800
700
600
500
400
300
200
100
0
16%
14%
12%
10%
8%
6%
4%
2%
0%
18 - 29
30 - 39
40 - 49
50 - 59
60 - 69
70 - 79
80 - 89
90 - 99
Age
Count
CMR

30-Day Mortality

Alive	2613	93%
Dead	186	7%



Median NELA Score Dead v Alive = 22.1% [range 1.3% to 87.9%] v 3.8% [range 0.03% to 95.5%] (p <0.001)

SMR 186 observed deaths / 262 expected deaths (**71%** [95% CI 61% to 82%])

Impression

- Recommendations made by NELA
- Quality improvement strategies
- Improvements in clinical decision making & care
- Reduction in mortality

Conclusion

The NELA score overestimates mortality risk and is therefore not well calibrated for high-risk emergency laparotomy patients

The NELA score remains highly useful for identifying high-risk patients

Acknowledgements

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- Prof David Watters

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Questions