Monitoring performance of cardiac surgery: the SCTS governance programme

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Monitoring performance of cardiac surgery: the SCTS governance programme

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Background

Mortality data in adult cardiac surgery for named surgeons: retrospective examination of prospectively collected data on coronary artery surgery and aortic valve replacement

Ben Bridgewater on behalf of the adult cardiac surgeons of north west England

Publishing mortality rates by named hospital and consultant since 2001 and 2005 respectively

The flow of data

Surgeon Imputed locally	→	**Database manager** Validated locally	→	**NICOR** Amalgamated nationally

↓

Manchester University Cleaned and analysed	←	**Hospital audit leads** Validation	←	**Manchester University** Cleaned and analysed

↓

SCTS Executive Notify members	→	**World wide web** Publication	→	

Data preprocessing

- **The registry is cleaned**:
  - transcriptional, numerical, temporal & clinical errors resolved
  - duplicate and non-cardiac records removed
- **The data is filtered**:
  - operations between 1st April 2008 & 31st March 2011
  - exclude transplantations; trauma; primary VADs
  - exclude minors (<18 years)
  - exclude private hospitals
  - exclude emergency & salvage procedures

Risk-adjustment

- Necessary to risk-adjust outcome measures

- Old models, e.g. logistic EuroSCORE, are miscalibrated

- Would lead to all units being identified as below the target
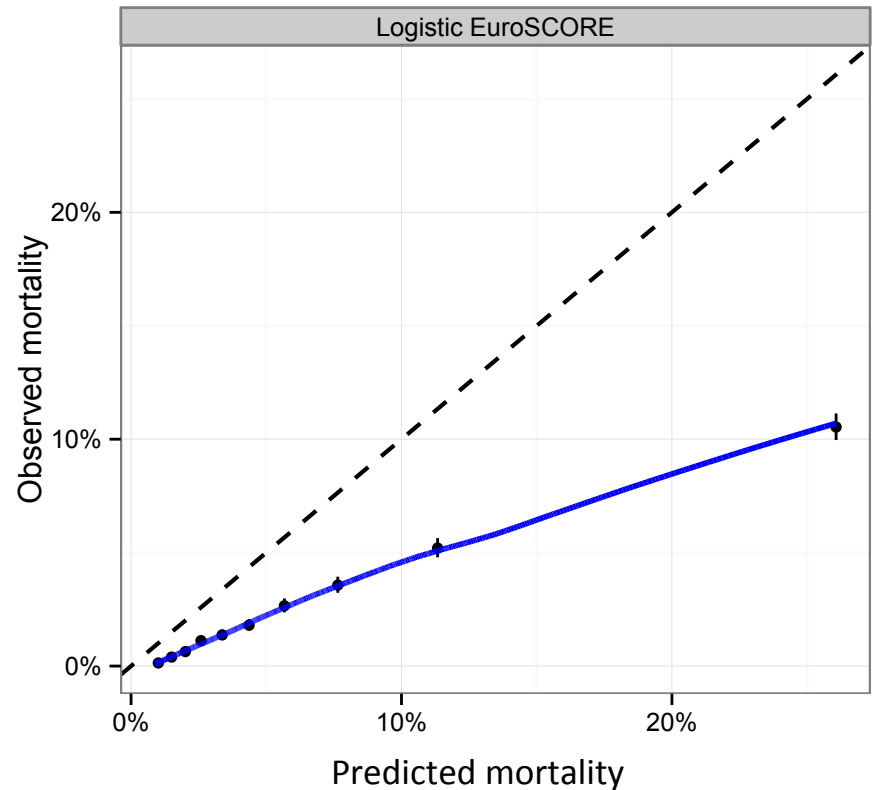
Risk-adjustment

- Build a new model
  - incomplete data
  - procedure specific?
- Refit existing model
  - does not fit contemporary cohort well
- Recalibrate existing model
  - only adjusts for single variable
- Other options...
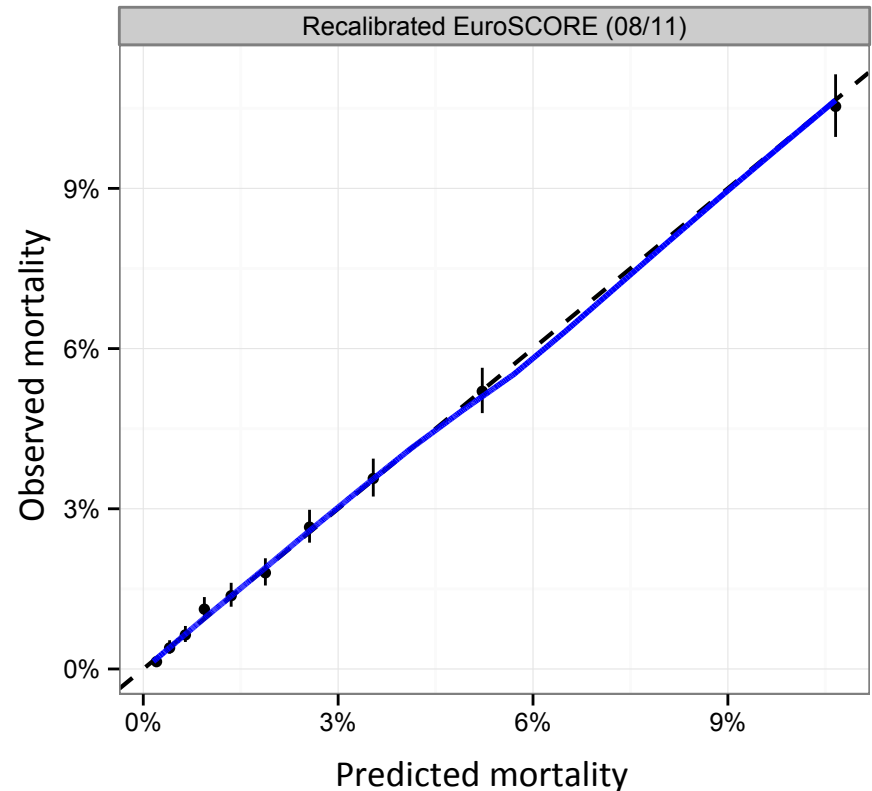
Goodness-of-fit: Hosmer-Lemeshow P = 0.56
Discrimination: AUC = 0.78

Defining divergence

- Funnel plot methodology
- Confidence intervals used to classify 'outliers'
- For consultant-level analysis we adjust for **multiple comparisons** (when making comparisons of many surgeons, high probability of identify ≥1 'outlier' due to chance)
- Standard errors are inflated due to observed **over-dispersion** (greater variability than expected by the binomial model)

Recalibrated EuroSCORE (08/11)
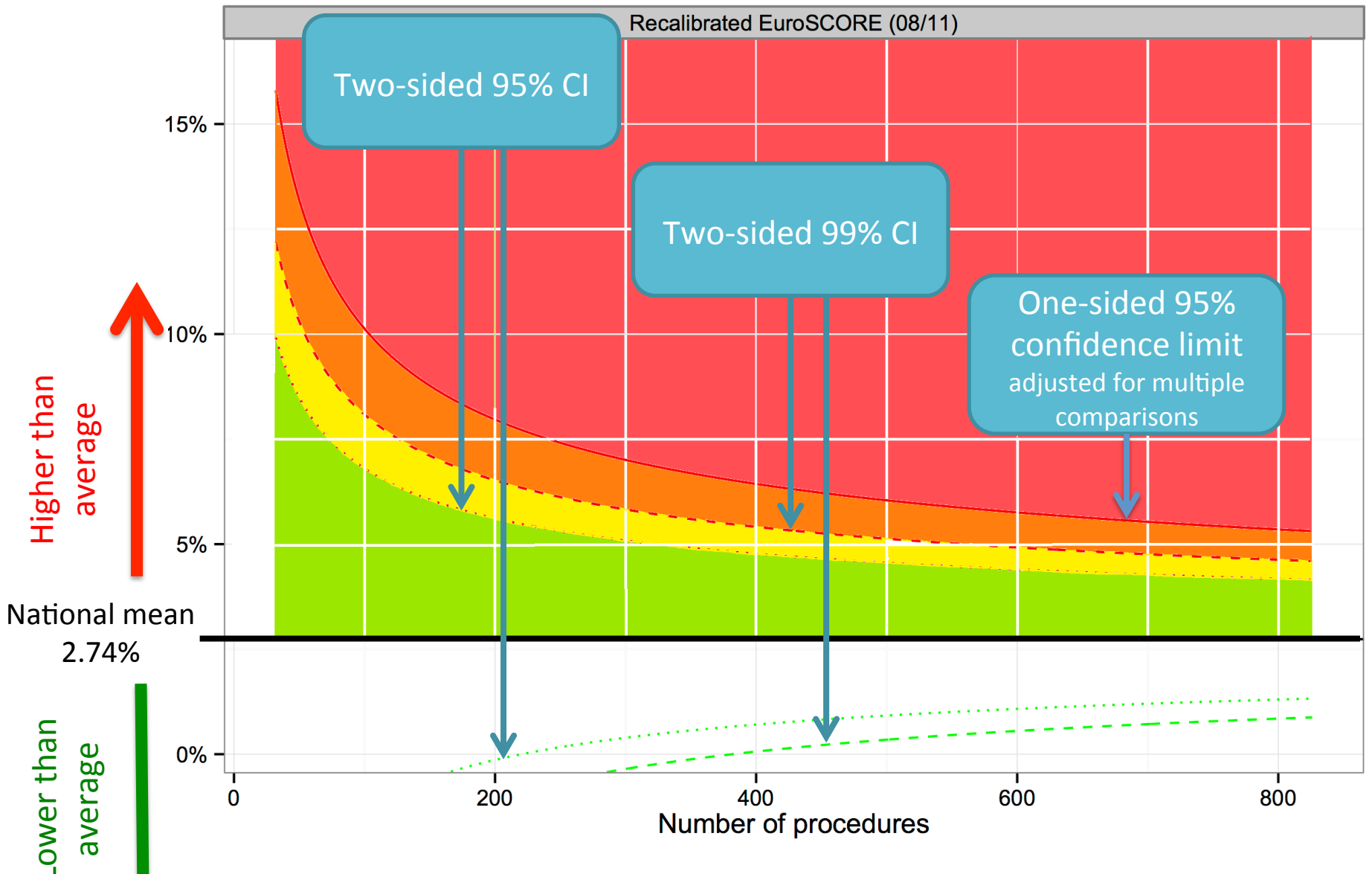
Outliers **above** the 'target' categorised as yellow (low level) / amber (higher level) / red (alert)

Results: hospitals
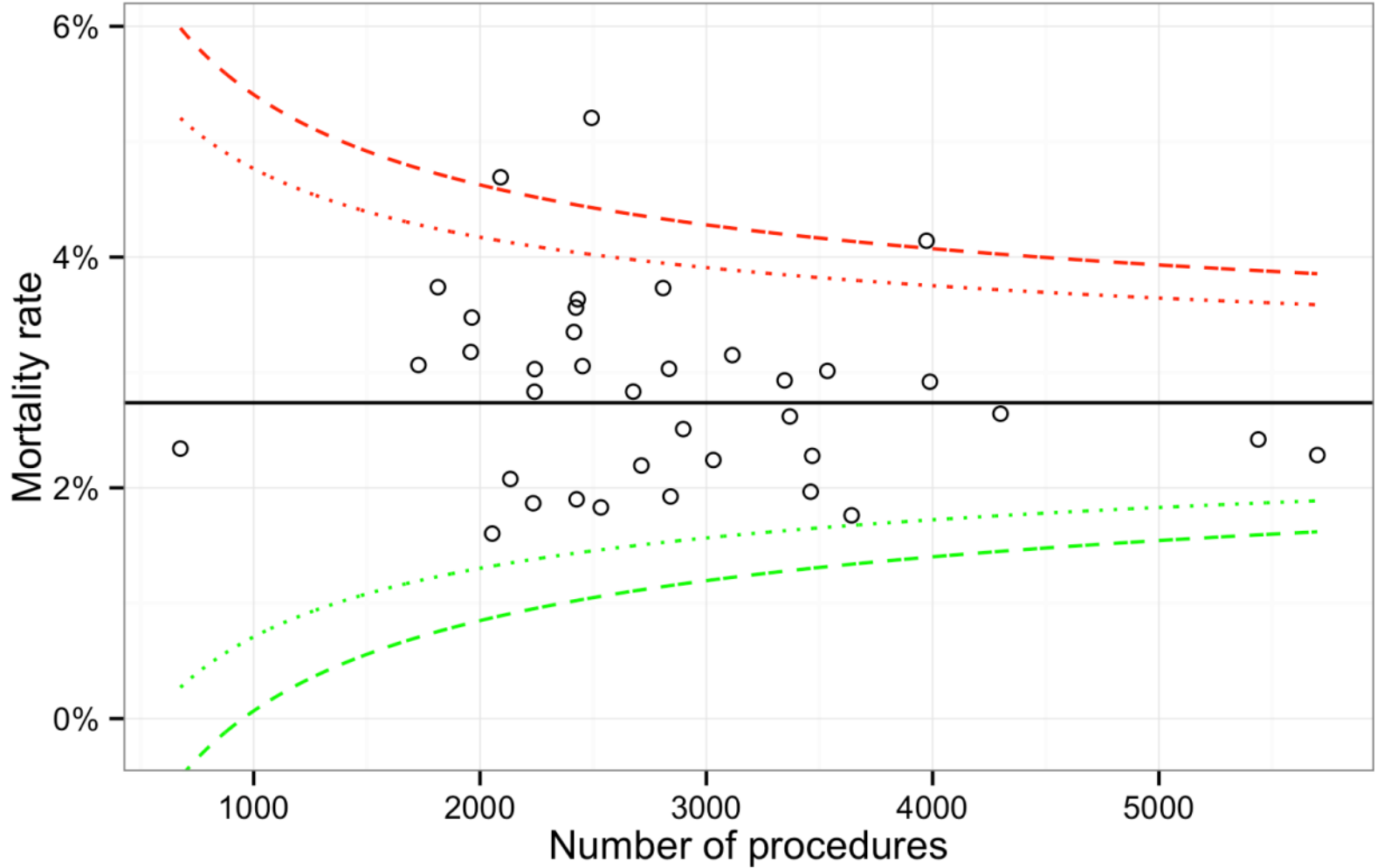
Results: consultants

Conclusions

- Identifying 'outlier' healthcare providers is methodologically (and politically) challenging

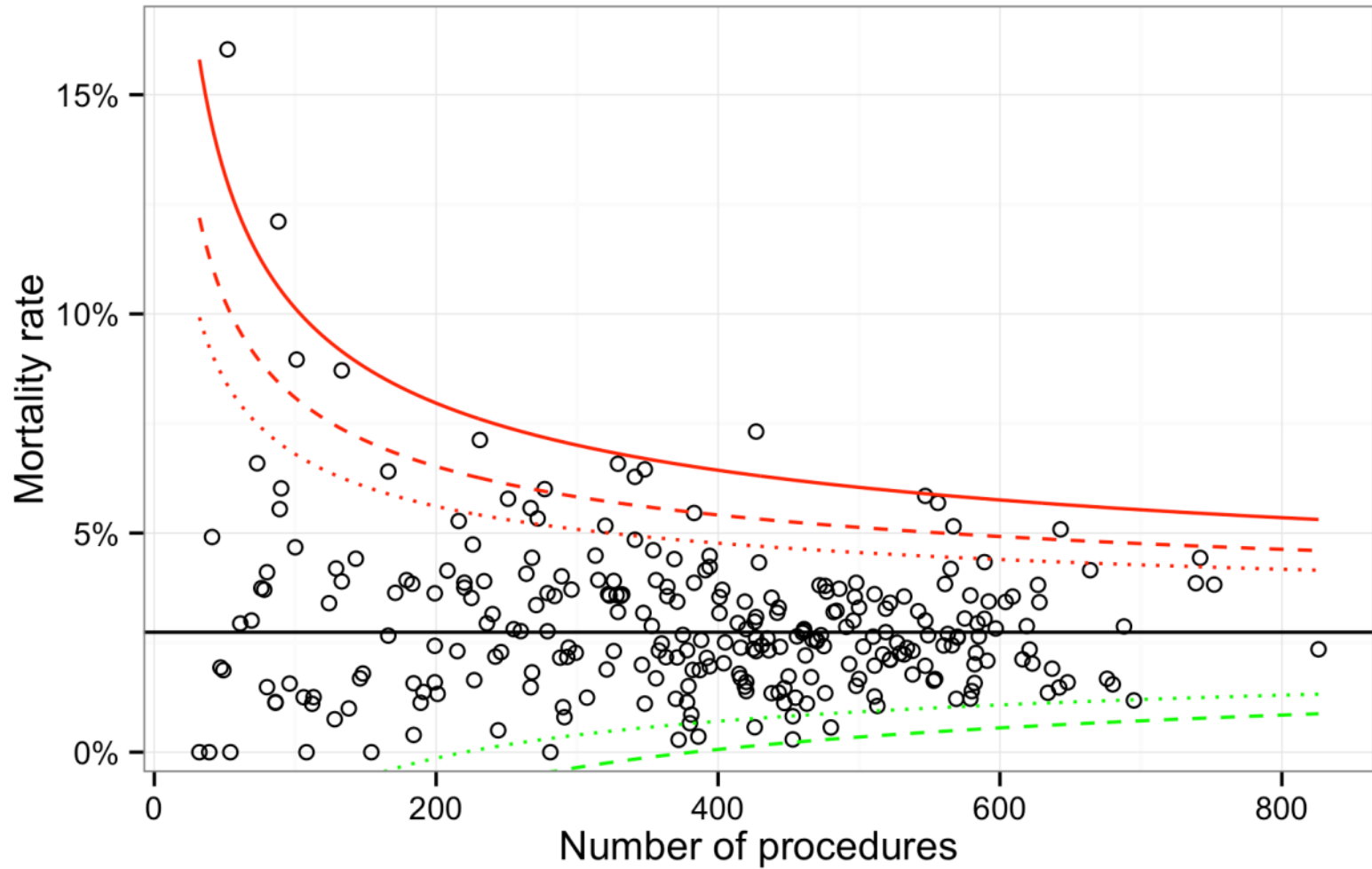- Combining clinical and analytical expertise can reduce errors in classification

- An 'outlier' does not necessarily imply poor practice; can be attributable to data quality or case mix

- Future analyses to explore using more sophisticated statistical methodology