(Dialysis) unit performance

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What are we trying to achieve?

- Inform patients?
- Reassure administrators?
- Improve performance
  - Of “poor” performers?
  - Overall?
- Show that something is happening so life can go on as always?
Things are getting better

Dialysis mortality rates

ANZDATA, censored at transplantation
Australia only
What is performance?

• What do we mean by “performance”
  – Financial ($)
  – Process (LOS, RSI, indicators)
  – Outcomes (quantity and quality of life)

• Basic theory:
  – identify outcome for a “centre” (and associated factors),
  – account for factors beyond their control (e.g. patient casemix)
    • But not factors used by a centre to achieve that outcome

• And then:
  – Identify poor performers?
  – Meet targets?
  – Identify characteristics associated with better performing units?
What do ANZDATA provide?

• Some process measures
  – Peritonitis
  – CVC rates
  – Hb, phosphate
  – DGF, Rejection rates

• Outcomes
  – Overall -- mortality
  – Technique specific (graft / technique survival)
Sources of variability in outcomes

- Total variability
  - Patient level factors
    - Measured
    - Unmeasured
  - Centre level factors
    - Measured
    - Unmeasured

- Controllable
- Uncontrollable
Dealing with confounding

• 3 ways of dealing with (measured) confounders
  – Restriction
  – Stratification
  – Adjustment

• Unmeasured confounders more difficult
  – One approach is to use a “random effect” to explicitly model unobserved heterogeneity between centres
Jargon

• Regression, hierarchical models, random effects, mixed models

\[ Y_{ij} = \beta_1 sex_{ij} + \beta_2 age_{ij} + c \]

\[ Y_{ij} = \mu + U_{i} + W_{ij} \]

\[ Y_{ij} = \mu + \beta_1 sex_{ij} + \beta_2 age_{ij} + U_{i} + W_{ij} \]
What do ANZDATA currently provide?

• Individual hospital reports for
  – Dialysis units*
  – Transplanting units*
  – Transplant caring units#

• Facility reports for
  – Dialysis facilities#

*include patient-level covariate adjusted analyses
#descriptive data (local and national) and univariate comparisons only
What’s in the black box?
Graphical output

Risk-adjusted Graft Failure Ratio at 1 Year

Expected Number of Graft Failures

Risk-adjusted Mortality Ratio at 1 Year

Expected Number of Deaths

Observations with missing values are dropped from the model.
Plans from here

- Release of identified centre reports has been endorsed at 2 Heads of Unit meetings
  - Also supported at DNT meetings 2011, 2013

- Consensus that material released to public should be based on the annual “Individual Hospital Report” based on verified end of year survey data.
Public reports
Areas for development

- Outcomes
- Methodology
- Implementation
Bayesian approach

• Current approach “frequentist”
  – Tests hypothesis that performance is (statistically) different to expected
• Bayesian approach has different basis
US flags

• 2 flags
  – Strong evidence underperformance=75% chance HR > 1.2
  – “Non-negligible” chance of strong underperformance=10% chance HR>2.5
Questions

• What is the aim of IHRs?
  – Is there evidence that they make a difference?

• Methodology
  – Several avenues for improvement
    • Need empiric evidence about comprehension / usefulness
  – Do we need more data in them (or fewer)

• Implementation
  – What happens to the reports once they are released?